

Interstate 90 – Snoqualmie Pass East

VISUAL IMPACT ASSESSMENT DISCIPLINE REPORT



September 2004



**Washington State
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SUMMARY

PROJECT OVERVIEW

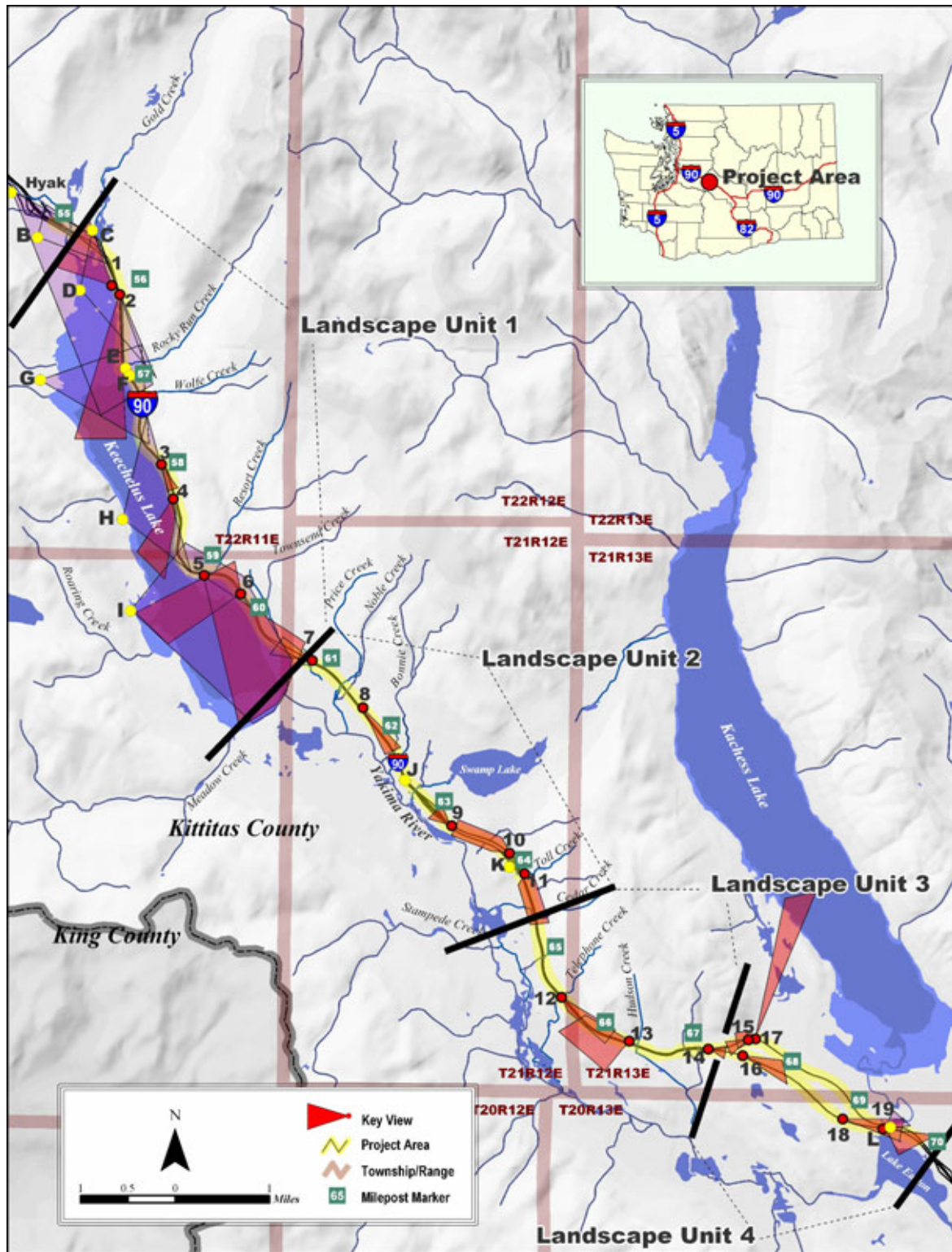


Figure 1 Map of project corridor with Landscape Units and Key Views

This project proposes to improve traveler safety by avoiding or minimizing exposure to avalanches and unstable slopes, addressing structural deficiencies, increasing capacity, and enhancing ecological connectivity by reconstruction of I-90 between Milepost (MP) 55.10 and MP 70.30. Four different Keechelus Lake Alignment Alternatives, ecological connectivity restoration options at fifteen locations, and the No-Build Alternative (existing conditions) were analyzed for this study. The visual impacts resulting from these alternatives were assessed by dividing the landscape into four Landscape Units based on topography.

In the vicinity of Keechelus Lake, WSDOT has developed four different design alternatives. Differences in these alignments exist only from MP 56.6 (just east of Rocky Run Creek) to MP 59.9 (Resort Creek), along the shore of Keechelus Lake. Collectively, these variations in design are referred to as the Keechelus Lake Alignment Alternatives. They are:

- No Build
- Alternative 1: Long Tunnels
- Alternative 2: Short Tunnels
- Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound
- Alternative 4: Both Directions of Traffic Along Keechelus Lake Around Slide Curve

In addition to the Keechelus Lake Alignment Alternatives, other improvements within the project corridor include the following:

- Additional lanes
- Wider medians and shoulders
- A truck climbing lane at Easton Hill
- Reconstructed interchange bridges
- Retaining walls
- Connectivity Restoration Areas (CRA's) to provide enhanced ecological connectivity

These CRA's are proposed at fifteen locations through the project corridor. Of these locations, Rocky Run Creek, Wolfe Creek, and Resort Creek are included within the Keechelus Lake Alignment Alternatives. Within the remaining CRA's, seven include multiple connectivity options to choose from. These connectivity restoration options at CRA's are referred to as Improvement Packages. The remaining CRA's have a single connectivity option.

These Improvement Packages include both roadway improvements and features to provide varying levels of ecological connectivity. These "levels" are broken into A, B, and C options, which represent a range of permeability and cost. For example, we would expect that a level A Improvement Package would restore ecological and hydrological connectivity to an optimal level at a premium price, while Improvement Packages B or C would restore connectivity at a reduced level and cost. These packages also provide a gradient in confidence limits, with A providing the highest degree of confidence, and B and C providing moderate and lower confidence levels.

This report analyzes the visual impacts of the project alternatives from thirty-one Key Views. The anticipated changes from project impacts and their mitigation for each Key View, along with the total visual quality ratings for the existing condition, provide a basis for comparison. For the area between MP 56.6 and MP 59.5, the four Keechelus Lake Alignment Alternatives are each analyzed. Within Landscape Unit 1, at the Resort Creek CRA, there are options that differ depending on which Keechelus Lake alignment alternative is selected. These are analyzed separately from the alignment alternatives. Since only one alignment alternative is proposed in the remainder of

Landscape Unit 1 and in the other three Landscape Units, each rating reflects anticipated visual changes related to differences in each CRA option.

Separating the ratings of the Keechelus Lake Alignment Alternatives from the Improvement Packages allows decision makers to determine which Keechelus Lake Alignment Alternative, and which of the Improvement Packages, will have the greatest or least visual impact. The decision makers' choices are:

1. Which Keechelus Lake Alignment Alternative?
2. Which Improvement Package at each of the seven locations with multiple CRA options?

STUDIES AND COORDINATION

The visual analysis was performed following the guidelines of the U.S. Department of Transportation, Federal Highway Administration (FHWA) publication *Visual Assessment for Highway Projects*, March 1981. Viewpoints were selected both from the highway and toward the highway according to visibility of the project, accessibility to the public, frequency of public use, and their representation of the overall impacts within the study area. These views were analyzed for vividness, intactness, and unity.

This portion of I-90 runs through US Forest Service (USFS) managed land. The Washington State Department of Transportation (WSDOT) is coordinating with the USFS on ecological connectivity, architectural guidelines, and plant selection for the I-90 Snoqualmie Pass East project corridor. In addition, WSDOT will coordinate with the USFS on the collection of native seeds, salvaging of native vegetation for the purpose of roadside revegetation, and restoration within the project limits.

The project corridor runs through the Mountains-to-Sound Greenway National Scenic Byway. In addition, it is designated as a Washington State Scenic Byway. WSDOT is coordinating with the Mountains-to-Sound Greenway Trust to ensure visual elements of the project will complement this status. The State and National Scenic Byway designations for the Mountains-to-Sound Greenway are based upon the route's "scenic character, intrinsic qualities, recreational opportunities, and general environmental experiences that exist along this heavily traveled route."¹ Because the designation is based upon the route's outstanding scenic character and significant environmental experiences, any changes in the corridor must be careful to retain those qualities as much as possible.

AFFECTED ENVIRONMENT AND IMPACTS

Landscape Unit 1 – MP 55.10 to MP 60.75

Landscape Unit 1 runs from the western project limits along the entire eastern shore of Keechelus Lake. The view from the road is of a sharp rise to the east, the lake, and distant mountains. The dominant landscape character in this unit is openness and the view of Lake Keechelus. This is the only Landscape Unit with extensive views toward the road.

¹ Mountains to Sound Greenway Implementation Plan, Volume I. P 1-6. 1998

The Keechelus Lake Alignment Alternatives are:

No Build

Alternative 1: Long Tunnels

Alternative 2: Short Tunnels

Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound

Alternative 4: Both Directions of Traffic Along Lake Keechelus Around Slide Curve

Because of the high visibility of structures in this landscape unit, it is especially important that the Architectural Guidelines be used to provide character and continuity.

Landscape Unit 2 – MP 60.75 to 64.41

Landscape Unit 2 is defined by broad, relatively flat topography as the road runs along the eastern side of the narrow valley formed by the Yakima River. Here, the landscape allows a wide median between the eastbound and westbound lanes of traffic. The forest dominates the view within Landscape Unit 2. There are filtered views toward the road from the Crystal Springs Campground and views of I-90 from Cabin Creek Sno-park in this Landscape Unit. The build alternatives in this Landscape Unit follow the existing alignment and add one lane in each direction. Landscape Unit 2 has several wildlife connectivity crossings proposed at locations including Price/Noble, Bonnie, and Swamp Creeks.

Landscape Unit 3 – MP 64.41 to 67.76

Landscape Unit 3's topography is similar to that of Landscape Unit 1, with a rise to the northeast and a valley to the southwest. The character of Landscape Unit 3 is mixed. There are both steep rock faces and forested foreground views. The road curves sinuously, with only a Jersey barrier separating the directions of traffic. There are no significant views toward the road in this Landscape Unit.

Electrical transmission lines run parallel to the road to the southwest. These lines lie approximately 400 feet from I-90. An additional lane of traffic in each direction would be accomplished by vertically separating the two directions of traffic. Some of the trees currently lining the southwest roadside would be removed to accomplish this. Their removal would increase views of the transmission lines from the roadway. The use of the Architectural Guidelines for barriers or retaining walls in this area is especially important for visual mitigation.

Landscape Unit 4 – MP 67.76 to 70.30

Landscape Unit 4 runs along a plateau south of Kachess Lake. There is a heavily vegetated, wide median that forms a hill between the two directions of traffic. There is a secure feeling when driving through this portion because of the wide median and the enclosure of the forest on both sides of the roadway. Mountain views are seen straight ahead, in the distance. This Landscape Unit forms the southeastern entry into the project area and is the eastern entry into the forests of western Washington. There are views toward the road from Lake Easton State Park.

There is one alignment proposed in this Landscape Unit with three options proposed at the Easton Hill CRA and one proposed at the Kachess River CRA. The new alignment moves the roadway slightly to the south for both lanes of travel. The portion of the westbound roadbed that will not be used will be restored to a native plant community. The new alignment will remove many trees.

Some large, old growth trees are just beyond the projected edge of the eastbound lanes. As many old growth trees as possible will be preserved from construction impacts.

MITIGATION

Impacts During Construction

Construction visual impacts involve removing vegetation, and temporary equipment locations and support structures such as falsework for bridge construction, and installation of construction and silt fencing. Equipment locations and falsework are temporary in nature, and will be limited to the highway segments under construction. Permanent mitigation consists of the use of Architectural Guidelines, and restoration of native vegetation and its related functions.

Permanent Project Impacts

Mitigation measures for permanent project impacts may include:

- Use of the project Architectural Guidelines. They recommend using a “Cascadian” style design theme developed by the project team in conjunction with the USFS and the Mountains-to-Sound Greenway Trust. The “Cascadian” theme uses native rock, or the appearance of native stone texture on walls, barriers, piers, and tunnel portals. It also may incorporate arches on the bridge piers. The consistent use of this design theme provides corridor continuity and rhythm. These standards include style, color, and texture of the manmade elements.
- Use of directional luminaires to minimize glare and nightsky disturbance to surrounding areas, and to focus light on the chain-up areas and at the ends of on and off ramps.
- Roadside restoration according to the *Roadside Classification Plan*’s “Forest” classification at Treatment Level 2.
- Use of vegetation, walls, or barriers to screen car movements from oncoming traffic and from views toward the road.
- Use of trees and other vegetation around tunnel portals, walls, and bridge structures to bring the structure down to human scale to visually tie the structure to the surrounding areas, and to soften and screen the structures within the viewshed
- Vegetating embankments to soften and blend the roadway with the surrounding landscape, and to provide a sense of continuity throughout the project corridor.
- Vegetating the median with shrubs, where possible, to provide a visual screen between oncoming lanes of traffic.
- Use of vegetation and compost filter strips to absorb stormwater to avoid the use of large drainage ponds. This should include the retention of large trees as much as possible.

CONCLUSION

Because this project is on a State and National Scenic Byway, visual quality of all components of the project is especially important. Many of the views from, and toward, I-90 already have very high visual quality, and retaining that quality is one of the many objectives of this project. The Architectural Guidelines and revegetation according to Treatment Level 2 of the Forested Classification, found in the *Roadside Classification Plan* are being proposed to achieve high visual quality within the project corridor. Best Management Practices (BMPs) found in the 2004 *Highway Runoff Manual* (WSDOT) such as natural dispersion areas and compost filter strips, can improve

the visual impacts of stormwater facilities by reducing the need for large stormwater ponds that were required in the past. All of these elements will provide the opportunity to blend the highway with the adjacent forest and to make the corridor even more memorable than it is at the present time.

KEECHELUS LAKE ALIGNMENT ALTERNATIVES

For the four Keechelus Lake Alignment Alternatives, Alternative 2: the Short Tunnels alternative has the highest visual quality ratings. The existing roadbed would not be needed if maintenance activities were conducted from the Hyak Maintenance facility, and fewer structures would be needed for ventilation of a smaller tunnel system than for the Long Tunnel Alternative. Alternative 2: the Short Tunnels would remove the road from the sight of viewers across the lake while minimizing the amount of time travelers on the highway would be in a tunnel. While ratings for views toward Alternative 1: Long Tunnels are very high because 1.9 miles of the existing roadbed would be removed, ratings for views from the road are very low for the time the traveler is inside the tunnel. This lowers the overall rating significantly.

Ratings for Alternatives 3 and 4 are very close to one another, and to Alternative 2. Alternatives 3 and 4 both retain I-90, with its views of the lake, around Slide Curve. Alternatives 3, and 4 have larger footprints than Alternatives 1 and 2. This decreases the opportunity for plantings to buffer and screen I-90 from views toward the road. Figure 2 provides a graphic comparison of the total average visual quality ratings for each of the Keechelus Lake Alignment Alternatives compared to the Existing Condition. Only Alternative 1 has ratings below the existing condition because of the views from the road while in the tunnel.

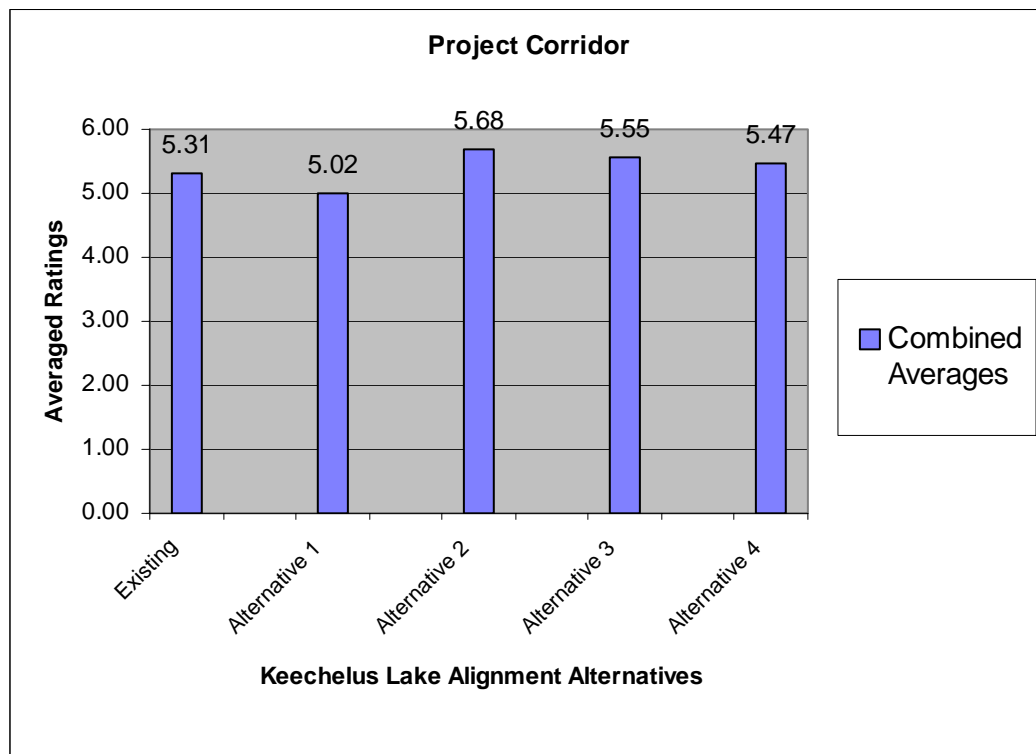


Figure 2 Comparison of Keechelus Lake Alignment Alternatives

These graphs and averages show ratings for all views from and toward the road. They provide a general basis for comparison. Details are found within each Key View description.

IMPROVEMENT PACKAGES

Where there are Improvement Package options for ecological connectivity, Improvement Package A has the highest visual quality ratings because of the opportunity for increased vegetation and the use of the Architectural Guidelines on bridge railings and bridge piers. All improvement packages are very close in visual quality averages and rate higher than the existing condition. Figure 3 shows the overall averaged ratings of the three Improvement Packages and their relationship to each other.

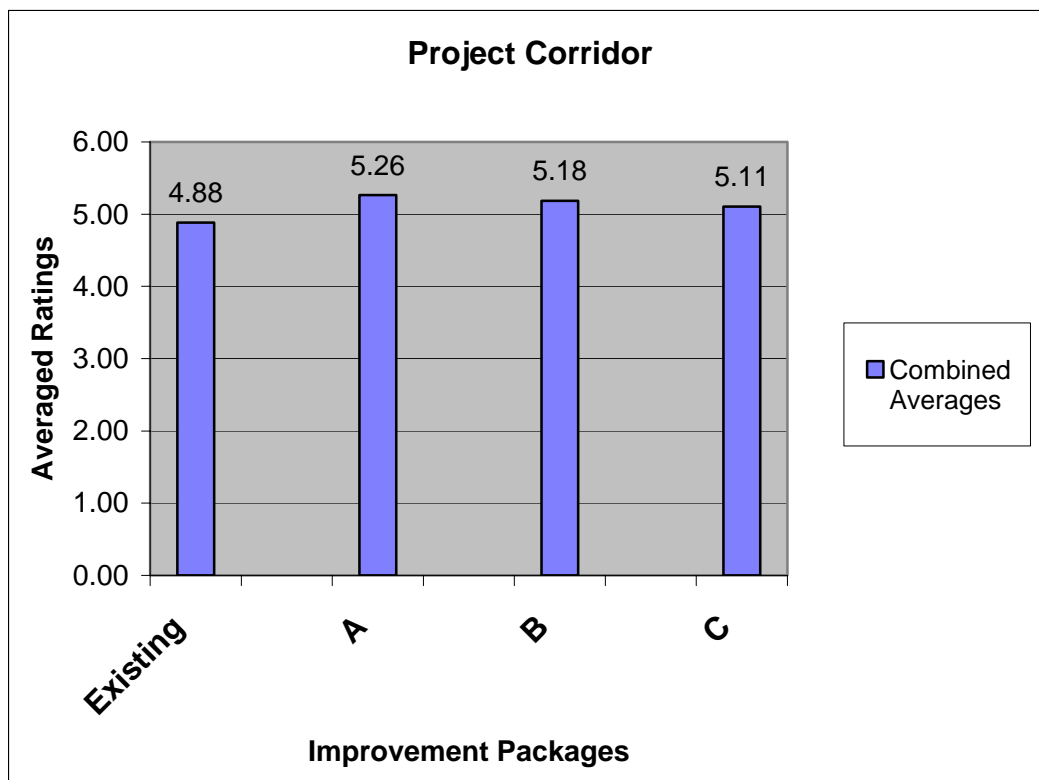


Figure 3 Comparison of Improvement Packages for Entire Project Corridor

Although the overall averages of each Improvement Package shows Option A to have the highest ratings, at some locations there are equal visual quality ratings for two options. For example, Improvement Packages A and B remove the pavement at the Price Creek Sno-park and restore native vegetation there. This results in equal ratings for Options A and B at that location. Increases in the opportunity for planting native vegetation raise visual quality ratings. Tables in Section 7 give the ratings for each Improvement Package Option at each Key View.

The combination of Improvement Package A with Keechelus Lake Alignment Alternative 2: the Short Tunnels Alternative would have the highest visual quality potential of all the proposed alternatives because of the opportunity for revegetation using a native plant community and the reduction of the I-90 footprint around Slide Curve, while not containing the traveler in a tunnel for a significant period of time under average driving conditions.

The Architectural Guidelines are a key component for providing corridor continuity – carrying a theme throughout the project corridor and for making this section of I-90 a memorable stretch of highway. When combined with native plant restoration, this project has the potential to improve the scenic quality of the Mountains to Sound Greenway between Hyak and Easton.

1. INTRODUCTION

1.1. REPORT ORGANIZATION AND SCOPE

This study is organized by Landscape Units with Key Views, both from the road and toward the road. Numbers designate Key Views *from* the road, while Key Views *toward* the road are organized by alphabet.

The scope of this study is limited to 31 key locations typical of each Landscape Unit, or from which views were especially important. Views toward the highway were chosen based upon number of viewers and duration of possible views.

1.2. OVERVIEW OF I-90 CORRIDOR PROGRAM

1.2.1. History

I-90 spans 300 miles in Washington from the Port of Seattle to the Idaho state line. Then, it continues east across the United States. WSDOT is developing a plan that will improve a portion of this corridor on the eastern side of Snoqualmie Pass from Milepost (MP) 55.1 to MP 70.3 (Hyak vicinity to the West Easton Interchange). This portion is part of what once was old US Highway 10 (the Sunset Highway).

Starting in the mid-1920s and through the 1930s, the Sunset Highway was constructed with Portland Cement Concrete Pavement (PCCP), replacing the older route known as Snoqualmie Pass Road. In the early 1950s, a snowshed was constructed in the vicinity of present-day MP 58. At that time, four lanes were anticipated, so an allowance for two additional lanes to the outside of the snowshed was made. During the late 1950s and early 1960s, most of the roadway along Keechelus Lake and along Easton Hill was reconstructed to a four-lane facility with a common median, while new two-lane roadways were constructed along most of the remaining Sunset Highway alignment. By the late 1960s and early 1970s, the original remaining old Sunset Highway portions and Slide Curve were realigned to meet interstate design standards, were repaved with new PCCP, and Highway 10 became part of the country's Interstate Highway System I-90. The existing snowshed continued to protect the westbound lanes, but nothing was constructed to protect the eastbound lanes in the avalanche-prone area.

The existing roadway is PCCP. The estimated life of the PCCP was 30 years. In the early 1980s, pavement cracking and panel settlement of the portions that were built in the late 1950s became apparent, and projects were developed to grind and retrofit the worst areas. By 1994, virtually the entire pavement structure from Hyak to the West Easton Interchange was showing signs of deterioration. Recent projects that have overlaid stretches of the PCCP with Asphalt Concrete Pavement (ACP), or have installed dowel bars into the existing concrete panels and diamond ground the concrete roadway, will extend the life of the roadway another 7-10 years.

1.2.2. I-90 Today

I-90 is the main east-west transportation corridor across Washington State and is vital to the state's economy, including shipping, recreation, and business travel. More than 27,000 vehicles cross the pass daily; over 20 percent are freight trucks. In 20 years, the daily traffic volume over Snoqualmie Pass is expected to increase by 20,000 vehicles. A sound, multi-modal transportation system is

needed to support the existing economy, facilitate desired growth, reduce the cost of congestion and inefficiency, and serve as a link to promote success in all regions.

Washington is the most trade-dependent state in the country according to the Washington State Economic Development Board. It is uniquely positioned as a gateway to the global economy. Maintaining transportation connections between ports, manufacturing and industrial centers, agricultural regions, and other key locations directly benefits the health of the state's economy.

Washington State possesses both a diverse geography and economy. Agriculture, wood products, fishing, aerospace, biomedical, manufacturing, technology-related, and other industry all depend on the transportation network to move customers, employees, goods, and supplies. A sound transportation network means lower freight costs, which may then be passed on to consumers as lower prices for goods, to workers as higher wages, and to owners of businesses as higher income.

1.3. PURPOSE OF THE PROPOSED ACTION

The purpose of this project is to improve public safety and meet traffic demand on a 15-mile portion of I-90 and to improve ecological connectivity along this corridor by:

- Reconstructing the roadway
- Improving operational efficiency
- Increasing capacity
- Improving safety
- Protecting and enhancing wildlife corridors in a 15-mile stretch of I-90 between the communities of Hyak (MP 55.1) and Easton (MP 70.3) in Kittitas County, Washington

1.4. NEED FOR THE PROPOSED ACTION

WSDOT is addressing several key issues through the implementation of this project. Specifically, the project would meet the following needs: 1) reduce the risks of avalanches to the traveling public and eliminate road closures required for avalanche control; 2) reduce the risk of rock and debris from unstable slopes reaching the roadway; 3) replace the damaged pavement; 4) provide for the growth increases in traffic volume; and 5) connect wildlife corridors and habitat across the freeway.

1.4.1. Avalanches

I-90 is frequently closed due to avalanches and associated control work. These closures strand motorists and freight on the pass, resulting in substantial safety hazards to the traveling public, travel delays, and impacts to the state's economy. The traveling public and movement of goods remain at risk as long as the problem is not addressed. The risk will increase proportionally with traffic growth.

From the period 1995 through 2001, I-90 was closed an average of 100 hours annually due to avalanches, avalanche control work, and rock slides. These closures can last from 10 minutes to several hours. Due to the volume of traffic, even short closures can cause long queues to form. For closures lasting up to 3 hours, it takes an additional 40 percent of the total closure time for the roadway to begin to function normally after it reopens (based on "Application of Queuing Theory" estimates.). It has been estimated that these closures cost Washington's economy \$17.5 million in use delays annually.

1.4.2. Unstable Slopes

I-90 is flanked by unstable slopes that result in rock and debris falling onto the roadway. These debris falls have caused property damage and loss of life. These slopes will continue to pose a threat to property and safety if their instability is not addressed. The Geotechnical Service Branch of WSDOT has identified 17 areas within the project limits that have unstable slopes where rock outfall and rockslides occur. During recent construction projects, slope scaling, rock bolting, and installing wire mesh have stabilized four of these areas. The remaining areas need to be addressed as part of this project.

1.4.3. Structural Deficiencies

The pavement on I-90 is beyond its design life, and the roadway is in a state of rapid deterioration. If it is not improved, continual deterioration of the roadway would result in unsafe driving conditions, increased vehicle damage, travel delay, and eventual failure of the roadway.

Maintaining safe transportation connections between ports, manufacturing and industrial centers, agricultural regions, and other key locations directly benefits the state's economy. Agriculture, wood products, fishing, aerospace, biomedical, manufacturing, technology-related and other industries all depend on the transportation network to move customers, employees, goods, and supplies. This key I-90 corridor must be in superior condition to support the economy of the State of Washington.

LOS A	Free-flow speed prevails. Vehicles can maneuver easily; incidents such as accidents, vehicles on road shoulders, etc., or point breakdowns (lane reduction, merging or weaving segments, etc.) do not affect traffic flow.
LOS B	Free-flow speeds are maintained. Vehicles can maneuver easily with only slight restriction; minor incidents and point breakdowns are still easily absorbed.
LOS C	Speed remains near free-flow, but freedom to maneuver is noticeably restricted. Minor incidents may still be absorbed, but the local deterioration in service will be substantial.
LOS D	Speed begins to decline slightly with increasing flows, and density increases more quickly. Freedom to maneuver is noticeably limited, and driver comfort level is significantly reduced; even minor incidents can be expected to create queuing since the traffic stream has little space to absorb disruptions.
LOS E	Unstable flow, with volume at capacity. Maneuverability within the traffic stream is extremely limited, and driver comfort level is poor; the traffic stream has no ability to dissipate even the most minor disruption, and any incident can be expected to produce a serious breakdown with extensive queuing.
LOS F	Breakdown in traffic flow. Queuing generally forms behind breakdowns.

Table 1 Level of Service Descriptions

1.4.4. Traffic Volume

Traffic volumes on I-90 are growing at an estimated 3½ percent per year. Level of Service (LOS) is a qualitative measure describing the operational conditions within a traffic stream, and categories of LOS are generally ranked in terms of speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. As described in Table 1, LOS conditions range from LOS A (ideal) to LOS F (breakdown). The existing four-lane facility normally operates at a LOS C or better; however, it is common for it to operate at LOS D or worse during peak hours. Summer weekend volumes have reached 55,000 vehicles per day. When traffic volumes are this high, traffic speed is below the free-flow speed, and any incident or breakdown location would cause traffic to back up and the flow to become restricted.

During the 20-year design period of the proposed action, average daily traffic volumes are expected to increase by 20,000 vehicles. If additional lanes are not provided, I-90 is predicted to operate at a LOS E in 2016 under normal driving conditions. The increased traffic would lead to higher accident rates, adverse economic impacts, and increased travel times, which greatly reduce the ability of the interstate to function as a safe and efficient roadway.

1.4.5. Ecological Connectivity

Previous studies have identified the need to correct ecological connectivity barriers created by the existing I-90 facility in the project corridor. Enhancing and improving the biological permeability of the roadway corridor would help achieve the goals of the *Northwest Forest Plan (NWFP)* for improving ecological connectivity within the *Snoqualmie Pass Adaptive Management Area (SPAMA)*. Improving connectivity across the I-90 corridor would help reduce demographic and genetic isolation of species, and reduce the risks to wildlife and the public from vehicle/wildlife encounters. WSDOT has embraced ecological connectivity as a key need for this corridor.

1.5. STUDY AREA

The study area for the I-90 Snoqualmie Pass East project consists of the proposed footprint of the realigned and widened roadway from the Hyak Interchange (MP 55.1) to the West Easton Interchange (MP 70.3) in Kittitas County. Kittitas County is a rural county, with a total population of 33,362 and covering 2,297 square miles (according to 2000 Census data).

2. NO BUILD ALTERNATIVE

Under the No Build alternative, only preservation of the existing roadway, structures, interchanges, drainage, and safety features would occur. The pavement would be rehabilitated periodically by overlaying with ACP. These projects would become more frequent as increased traffic volumes are experienced. No improvements are proposed. The visual impacts of this alternative are described in this report as the “Existing Condition.”

3. DESCRIPTION OF BUILD ALTERNATIVES

Within the Build Alternative, in the vicinity of Keechelus Lake, WSDOT has developed four different Build Alternatives. Differences in the Build alignments exist only from MP 56.6 (just east of Rocky Run Creek) to MP 59.9 (Resort Creek), along the shore of Keechelus Lake. Collectively, these variations in design are referred to as the Keechelus Lake Alignment Alternatives. They are:

- Alternative 1: Long Tunnel
- Alternative 2: Short Tunnel
- Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound
- Alternative 4: Both Directions of Traffic Along Keechelus Lake Around Slide Curve

In addition to the Keechelus Lake Alignment Alternatives, other improvements within the project corridor include the following:

- Additional lanes,
- Wider medians and shoulders
- A truck climbing lane at Easton Hill
- Reconstructed interchange bridges
- Retaining walls

- Connectivity Restoration Areas (CRA's) to provide enhanced ecological connectivity. These CRA's are proposed at fifteen locations through the project corridor. Of these locations, Rocky Run Creek, Wolfe Creek, and Resort Creek are included within the Keechelus Lake Alignment Alternatives. Within the remaining CRA's, seven include multiple connectivity options to choose from. These CRA's are referred to as Improvement Packages. The remaining CRA's have a single connectivity option.

These Improvement Packages include both roadway improvements and features to provide varying levels of ecological connectivity. These "levels" are broken into A, B, and C options, and represent a range of permeability and cost. For example, we would expect that a level A Improvement Package would restore ecological and hydrological connectivity to an optimal level at a premium price, while Improvement Packages B or C would restore connectivity at reduced level and cost. These packages also provide a gradient in confidence limits, with A providing the highest degree of confidence, and B and C providing moderate and lower confidence levels.

The following alternatives are for Landscape Unit 1. At Gold Creek there are three connectivity restoration options proposed as part of the Improvement Packages. At Rocky Run Creek, Wolf Creek, and Townsend Creek there is a single design option proposed for each. Between milepost (MP) 56.6 and MP 59.9 there are four Keechelus Lake Alignment Alternatives proposed. At Resort Creek, there are multiple design options, which are included within the Keechelus Lake Alignment Alternatives.

3.1. KEECHELUS LAKE ALIGNMENT ALTERNATIVE 1: LONG TUNNELS

The first Keechelus Lake Alignment Alternative would construct twin three-lane tunnels for a distance of 1.9-miles (Figure 4). This design completely removes the substandard curves within this section of the Common Route and realigns the interstate to meet 70 mph design standards. Because this alternative bypasses all avalanche zones, it eliminates the potential for accidents, injuries, and road closures from avalanches within this area. It also eliminates the threat of accidents and injuries from rock fall by avoiding unstable slopes. That portion of the existing roadway along Keechelus Lake rendered obsolete by the tunnel would be removed and reclaimed. Because of the Keechelus Lake snowshed's status as an historic feature, coordination with the State Historic Preservation Officer (SHPO) will be required to determine its future.



Figure 4 Keechelus Lake Alignment Alternative 1 - Long Tunnel

Because this alternative bypasses all avalanche zones, it eliminates the potential for accidents, injuries, and road closures from avalanches within this area. It also eliminates the threat of accidents and injuries from rock fall by avoiding unstable slopes. That portion of the existing roadway along Keechelus Lake rendered obsolete by the tunnel would be removed and reclaimed. Because of the Keechelus Lake snowshed's status as an historic feature, coordination with the State Historic Preservation Officer (SHPO) will be required to determine its future.

Rocky Run Creek CRA: Existing conveyance structures at Rocky Run Creek include twin 6-foot corrugated metal culverts at the westbound crossing, and a 100-foot bridge at the eastbound crossing. Twin single-span bridges (approximately 120-feet long) that will provide for fish passage at all reservoir pool-levels are proposed at the Rocky Run Creek CRA.



Figure 5 Rocky Run Creek CRA

Wolfe Creek CRA: Conveyance structures currently in place at Wolfe Creek include a 6-foot corrugated metal culvert under both the west and eastbound lanes. A large-span (10-foot to 30-foot span) bottomless culvert that will provide for fish passage at all reservoir pool-levels is proposed at both the eastbound and westbound creek crossings.



Figure 6 Wolf Creek CRA

Resort Creek CRA Under Alternative One: Existing conveyance structures at Resort Creek include a 6-foot corrugated metal culvert under both the west and eastbound lanes. This alternative includes constructing twin single-span bridges (approximately 120-feet long) that will provide for fish passage at all reservoir pool-levels.

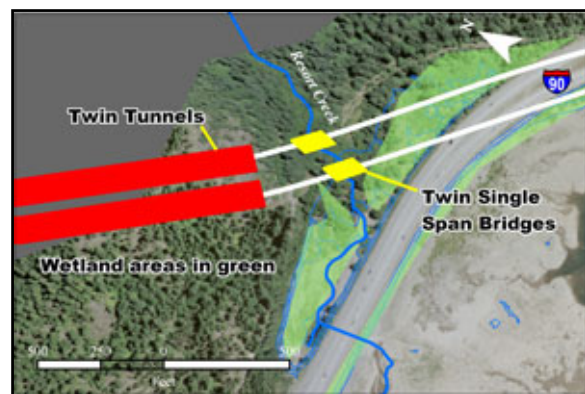


Figure 7 Resort Creek CRA Under Alternative 1

3.2. KEECHELUS LAKE ALIGNMENT ALTERNATIVE 2: SHORT TUNNELS

Keechelus Lake Alignment Alternative 2 would construct twin three-lane tunnels for a distance of 0.6-miles that bypass Slide Curve (Figure 8). This design would straighten the substandard curves from just east of Rocky Run Creek to the snowshed and completely remove the substandard curves at Slide Curve. Realignment of the substandard curves would allow the interstate to meet 70 mph design standards.

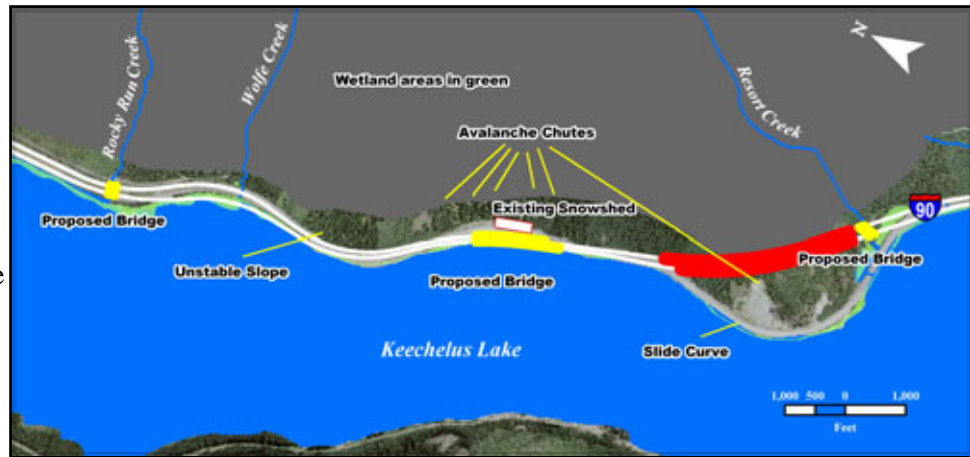


Figure 8 Keechelus Lake Alignment Alternative 2 - Short Tunnels

Bridges would be constructed over Keechelus Lake in the vicinity of the existing snowshed to convey avalanches under the roadway, significantly reducing the potential for injuries and road closures due to avalanches. Mitigation measures to reduce accidents and injuries from rock fall include slope netting or rock bolting. Because of the Keechelus Lake snowshed's status as an historic feature, coordination with the State Historic Preservation Officer (SHPO) will be required to determine its future.

3.3. KEECHELUS LAKE ALIGNMENT ALTERNATIVE 3: SHORT TUNNEL WESTBOUND, NO TUNNEL EASTBOUND

Keechelus Lake Alignment Alternative 3 would construct a three-lane tunnel for a distance of 0.6-miles in the westbound direction, and three eastbound lanes that approximate the existing footprint (Figure 9). This design would straighten the substandard

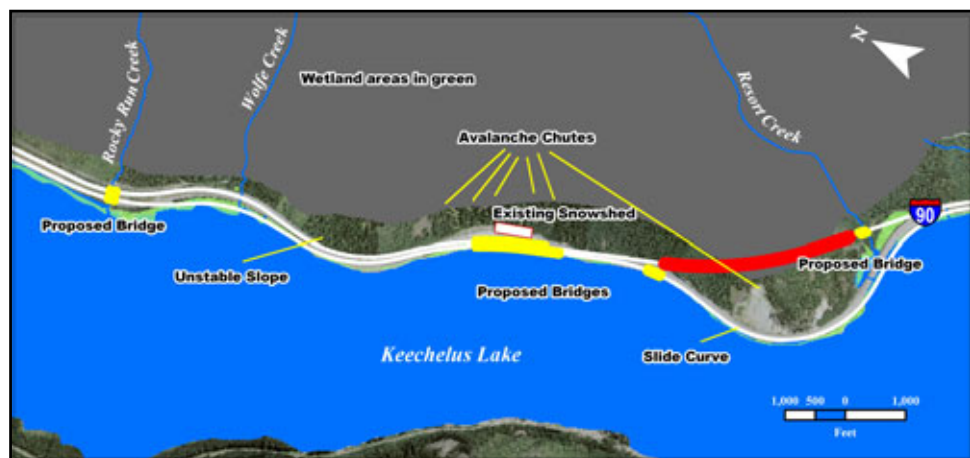


Figure 9 Keechelus Lake Alignment Alternative 3 - Short Tunnel Westbound, No Tunnel Eastbound

curves from just east of Rocky Run Creek to the snowshed, and remove the substandard curves in the westbound direction at Slide Curve. Westbound lanes would meet 70 mph design standards; eastbound lanes would meet 65 mph design standards. Bridges would be constructed over Keechelus Lake in the vicinity of the existing snowshed to convey avalanches under the roadway, significantly reducing the potential for injuries and road closures from avalanches. Avalanche fencing would be constructed on the slopes above Slide Curve to protect eastbound lanes from avalanches. Mitigation measures to reduce accidents and injuries from rock fall include slope netting or rock bolting. Because of the Keechelus Lake snowshed's status as an historic feature, coordination with the State Historic Preservation Officer (SHPO) will be required to determine its future.

Resort Creek CRA Under Alternative Three:

Restoration measures for Rocky Run Creek and Wolfe Creek CRAs within Alternative 3 are identical to Alternative 1. However, the existing 6-foot corrugated metal culverts at Resort Creek would be replaced by a single-span bridge (120-foot long x 10-foot high) in the westbound lanes, and a series of large-span (10-foot to 30-foot span) bottomless culverts in the eastbound lanes that will provide for fish passage at all reservoir pool-levels.

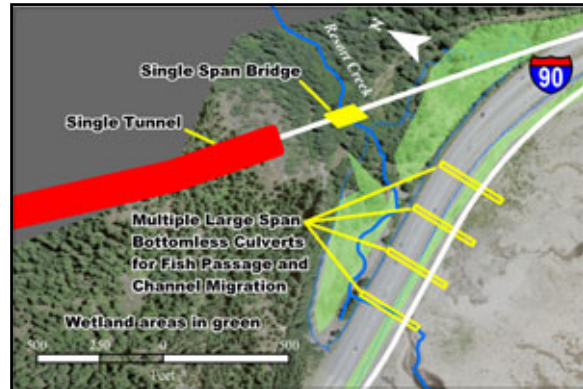


Figure 10 Resort Creek CRA Under Alternative 3

3.4. KEECHELUS LAKE ALIGNMENT ALTERNATIVE 4: NO TUNNELS, BOTH DIRECTIONS OF TRAFFIC ALONG KEECHELUS LAKE

The fourth Keechelus Lake Alignment Alternative would construct three lanes in both the westbound and eastbound directions around Slide Curve (Figure 11). This design would straighten the substandard curves from just east of Rocky Run Creek to the snowshed, but would not remove the substandard curves at Slide Curve. Consequently, both westbound and eastbound lanes would meet 60 mph design standards.



Figure 11 Map of Alternative 4 - No Tunnels, Both Directions of Traffic Along Keechelus Lake

Bridges would be constructed over Keechelus Lake in the vicinity of the existing snowshed that would convey avalanches under the roadway, significantly reducing the potential for injuries and road closures due to avalanches. Avalanche fencing would be constructed on the slopes above Slide Curve to protect both westbound and eastbound lanes from avalanches. Mitigation measures to reduce accidents and injuries from rock fall include slope netting or rock bolting. Because of the Keechelus Lake snowshed's status as an historic feature, coordination with the State Historic Preservation Officer (SHPO) will be required to determine its future.

Resort Creek CRA Under Alternative Four:

Restoration measures for Rocky Run Creek and Wolfe Creek CRAs within Alternative 4 are identical to alternative 1. However, the existing 6-foot corrugated metal culverts at Resort Creek would be replaced by a series of large-span (10 - 30-foot) bottomless culverts across both the westbound and eastbound lanes.

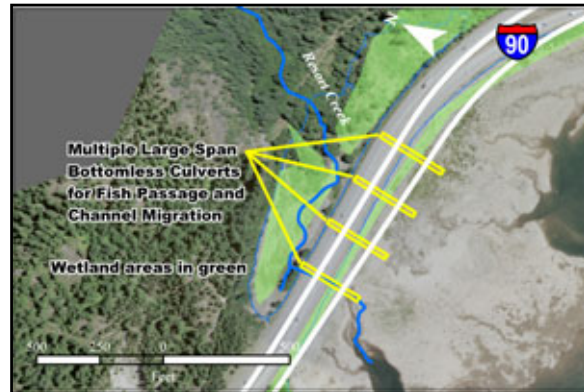


Figure 12 Resort Creek CRA Under Alternative 4

This section presents restoration options for each of the CRAs outside the Keechelus Lake Alignment Alternatives, which have been discussed. Gold Creek, Price-Noble Creeks, Bonnie Creek, Swamp Creek, Toll Creek, Resort Creek, Hudson Creek, and Easton Hill CRAs have multiple design options to allow fish passage and the movement of terrestrial species.

Because the structure and function of aquatic, riparian, and terrestrial habitats are less dynamic at Townsend Creek, Cedar Creek, Telephone Creek, and Kachess River CRAs, and are not aligned with migration corridors, the Multidisciplinary Team (MDT) recommended, and the Interagency Disciplinary Team (IDT) concurred, that one design option for each of these areas would suffice. Therefore, the WSDOT project team developed one preliminary design for each of these areas. Figure 13, on the previous page, shows all the CRAs within the project corridor.

4.1.1. Gold Creek CRA

Bridges would provide for additional channel migration, wetland connectivity, and the movement of aquatic, semi-aquatic and terrestrial species. The full benefits of constructing connectivity improvements at this location will not be realized until the USFS constructs a bridge of similar dimensions on Forest Road (FR) 4832, located immediately to the north. Replacement of this bridge is not a part of the WSDOT I-90 corridor project. The restoration options below offer solutions for improving connectivity within the Gold Creek CRA.

Gold Creek Area Option A:

Option A proposes that twin single-span bridges (approximately 120-feet long) be constructed at the western edge of the Gold Creek floodplain. Additionally, two multi-span bridges (approximately 900-feet long in the westbound direction and 1100-feet long in the eastbound direction) would be constructed across the channel migration zone. The bridges would provide a clearance of at least 18 feet. Removal of existing roadbed within the channel migration zone would allow for channel migration, and would help to restore aquatic, riparian, and terrestrial habitat components. The open area provided by these structures would encourage the year-round movement of aquatic, semi-aquatic and terrestrial species. This design option meets the I-90 Mitigation Development Team objectives.

Gold Creek Area Option B: Option B would construct Multi-span bridges (approximately 1,000 feet long westbound and 1,200 feet long eastbound) across Gold Creek's channel migration zone. The bridges would provide a clearance of at least 18 feet. A 100-foot wide terrestrial connectivity bench would be constructed adjacent to the western abutments of both bridges and extend across the northwest shoreline of Keechelus Lake to provide a location for the movement of semi-aquatic and

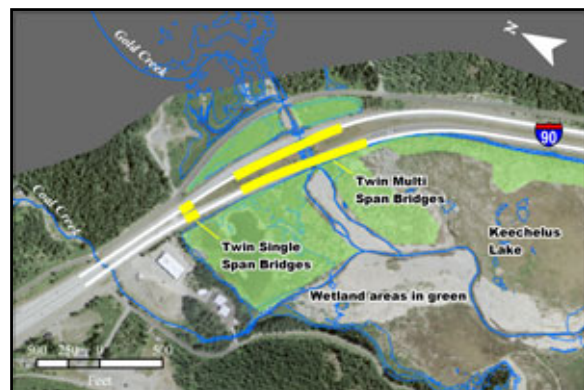


Figure 14 Gold Creek CRA Under Option A

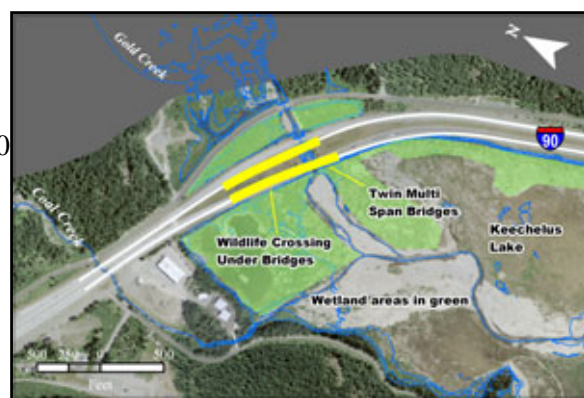


Figure 15 Gold Creek CRA Under Option B

terrestrial species year-round. The existing road embankment would be removed to allow for normal channel migration, and would help to restore aquatic, riparian, and terrestrial habitat components. This design option meets the I-90 Mitigation Development Team objectives.

Gold Creek Area Option C:

Twin single-span bridges (approximately 120-foot long) would be constructed at the western edge of the Gold Creek floodplain. Both bridges would have a clearance of 12-feet. Twin multi-span bridges (approximately 300-foot long) would be constructed across most of the active channel migration zone. Removal of existing road embankment would increase normal channel migration, and help restore the aquatic, riparian, and terrestrial habitat components. This design option does not currently meet the I-90 Mitigation Development Team objectives, but could if modified further.

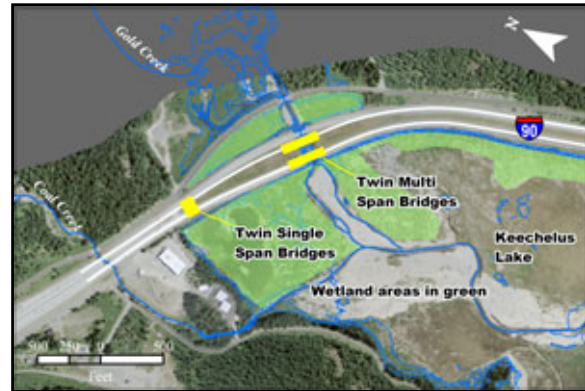


Figure 16 Gold Creek CRA Under Option C

4.1.2. Townsend Creek CRA

Connectivity in the Townsend Creek CRA will be improved by constructing a large span bottomless culvert (10-foot to 30-foot span) that would provide for the movement of aquatic, semi-aquatic, and terrestrial species.



Figure 17 Townsend Creek CRA

4.1.3. Price/Noble Creek CRA

Bridges would provide for channel migration, wetland connectivity, and the movement of aquatic, semi-aquatic and terrestrial species. Methods to convey water through the roadbed will be incorporated within hydrologic connectivity zones. The westbound lanes access the Price Creek Sno-park facility during the winter. The eastbound lanes provide access to public restrooms and have recently opened for year-round use. The restoration options below offer solutions for improving connectivity within the Price & Noble Creeks CRA.

Price/Noble Creeks Area Option A:

Under this option, twin single-span bridges (approximately 120-feet long) would be constructed over a draw in the vicinity of MP 60.9, providing at least 18-feet of vertical clearance for the movement of animals through this area. Methods to convey water through the roadbed will be incorporated within the hydrologic connectivity zone in the vicinity of MP 61.0. Twin multi-span bridges (approximately 800-feet long) would be constructed over Price and Noble Creeks. Twin multi-span bridges (approximately 800-feet long) with a minimum vertical clearance of 1-foot would be constructed east of Noble Creek to encourage the movement of both surface and groundwater through the I-90 road prism. The pavement at the Price Creek facility would be removed, and the area would be restored to natural conditions. This design option meets the I-90 Mitigation Development Team objectives.



Figure 18 Price/Noble Creek CRAs Under Option A

Price/Noble Creeks Area Option B:

Option B would construct twin single-span bridges (approximately 120-feet long) over a draw in the vicinity of MP 60.9, providing at least 18-feet of vertical clearance for the movement of animals through this area. Methods to convey water through the roadbed will be incorporated within the hydrologic connectivity zone in the vicinity of MP 61.0. Twin single-span bridges (approximately 800-feet long) would be constructed over Price and Noble Creeks.

Methods to encourage the movement of both surface and groundwater through the I-90 road prism within the hydrologic connectivity zone east of Price Creek will be finalized upon further investigation. The pavement at the Price Creek facility will be removed, and the area would be restored to natural conditions. This design option meets the I-90 Mitigation Development Team objectives.



Figure 19 Price/Noble Creek CRAs Under Option B

Price/Noble Creeks Area Option C:

Twin single span bridges (approximately 120 feet long) would be constructed over a draw in the vicinity of MP 60.9, providing at least 18-feet of vertical clearance for the movement of animals through this area. Methods to convey water through the roadbed will be incorporated within the hydrologic connectivity zone in the vicinity of MP 61.0. Twin single-span bridges (approximately 120-feet long) would be constructed over Price Creek. Methods to encourage the movement of both surface and groundwater through the I-90 road prism within the hydrologic connectivity zone east of Price Creek will be finalized upon further investigation. The current Sno-park/public restroom facility would remain under this option. This design option does not currently meet the I-90 Mitigation Development Team objectives, but could if modified further.



Figure 20 Price/Nobel Creek CRAs Under Option C

4.1.4. Bonnie Creek CRA

On some alternatives, bridges would provide for channel migration, wetland connectivity, and the movement of aquatic, semi-aquatic and terrestrial species, others will utilize large culverts. Methods to convey water through the roadbed will be incorporated within hydrologic connectivity zones. The restoration options below offer solutions for improving connectivity within the Bonnie Creek CRA.

Bonnie Creek Area Option A:

Option A would construct twin multi-span bridges (approximately 600-feet long) with a minimum vertical clearance of 20-feet across Bonnie Creek and an unnamed creek 300-feet to the west. Methods to convey water through the roadbed will be incorporated within the hydrologic connectivity zone approximately 500-feet east of the bridge. This design option meets the I-90 Mitigation Development Team objectives.



Figure 21 Bonnie Creek CRA Under Option A

Bonnie Creek Area Option B:

Under option B, twin two-span bridges (approximately 250-feet long) would be constructed across Bonnie Creek providing at least 12-feet of vertical clearance for the movement of animals through this area. Methods to promote the movement of both surface and groundwater through the I-90 road prism will be incorporated within the hydrologic connectivity zones approximately 500-feet east of the bridge and at the unnamed tributary west of the bridge. This design option does not meet the I-90 Mitigation Development Team objectives.



Figure 22 Bonnie Creek Under Option B

Bonnie Creek Area Option C:

Bottomless culverts that provide for fish passage would be constructed over Bonnie Creek. Methods to promote the movement of both surface and groundwater through the I-90 road prism will be incorporated within the hydrologic connectivity zone approximately 500-feet east of the bridge and at the unnamed tributary west of the bridge. This design option does not meet the I-90 Mitigation Development Team objectives.



Figure 23 Bonnie Creek CRA Under Option C

4.1.5. Swamp Creek CRA

Bridges would provide for channel migration, wetland connectivity, and the movement of aquatic, semi-aquatic and terrestrial species. Methods to convey water through the roadbed will be incorporated within hydrologic connectivity zones. The restoration options below offer solutions for improving connectivity within the Swamp Creek CRA.

Swamp Creek Area Option A: Twin multi-span bridges (approximately 250-feet long) with a minimum vertical clearance of 15-feet would be constructed over Swamp Creek. I-90 would pass over Stampede Pass Road. Methods to promote the movement of both surface and groundwater through the I-90 road prism will be incorporated within the hydrologic connectivity zones. One set of twin single-span bridges would be constructed in vicinity of the interchange, and another set of twin single-span bridges (approximately 120-feet long) would be constructed at the east end of the interchange. This design option does not meet the I-90 Mitigation Development Team objectives.

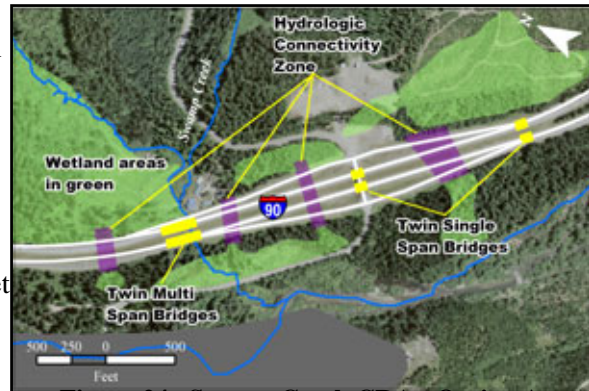


Figure 24 Swamp Creek CRA - Option A

Swamp Creek Area Option B: Option B would construct twin single-span bridges (approximately 120-feet long) across Swamp Creek. The profile of the interstate would be raised from 3-feet to 5-feet to increase the clearance over the creek. Methods to promote the movement of both surface and groundwater through the I-90 road prism will be incorporated within the hydrologic connectivity zones. Twin single-span bridges (approximately 120 feet long) would be constructed at the east end of the interchange. The existing undercrossing would be replaced to meet current clearance standards. At the request of the US Forest Service, twin single-span bridges were added west of Swamp Creek near MP 62.5. With this design modification, Swamp Creek Option B meets the I-90 MDT's objectives.

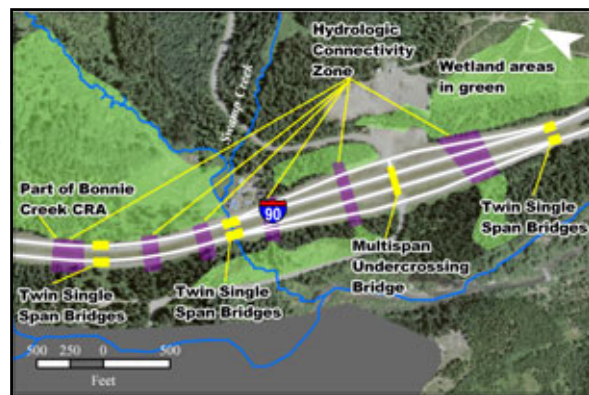


Figure 25 Swamp Creek CRA - Option B

Swamp Creek Area Option C: Twin single-span bridges (approximately 120-feet long) would be constructed across Swamp Creek. The interstate's profile would remain approximately the same. Methods to promote the movement of both surface and groundwater through the I-90 road prism will be incorporated within the hydrologic connectivity zones. The existing undercrossing would be replaced to meet current clearance standards. A bottomless

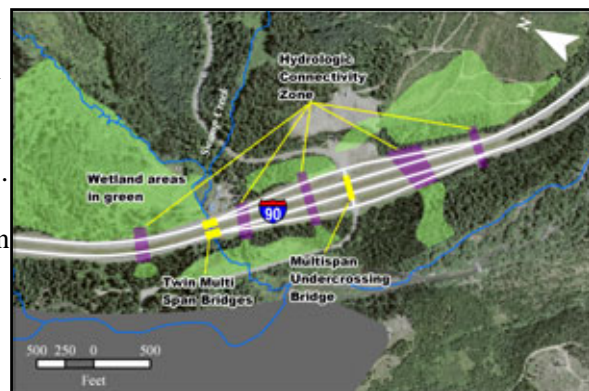


Figure 26 Swamp Creek CRA Under Option C

culvert would be constructed at the east end of the interchange for conveying surface water. This design option does not meet the I-90 Mitigation Development Team objectives.

4.1.6. Toll Creek CRA

On some options bridges would provide for channel migration, wetland connectivity, and the movement of aquatic, semi-aquatic and terrestrial species. Bottomless culverts would also be used to convey water through the roadbed. The restoration options below offer solutions for improving connectivity within the Toll Creek CRA.

Toll Creek Area Options A and B:

Options A and B would construct twin single-span bridges (approximately 120-feet long) with a minimum vertical clearance of 15-feet at the unnamed creek west of the Cabin Creek Interchange to provide for the passage of aquatic, semi-aquatic, and terrestrial species. Twin bottomless culverts would be installed at Toll Creek that accommodate the hydraulic potential of the stream and permits the passage of debris. These design options meet the I-90 Mitigation Development Team objectives.



Figure 27 Toll Creek CRA Options A & B

Toll Creek Area Option C: Under option C, twin bottomless culverts would be constructed at the unnamed creek west of the Cabin Creek Interchange to provide for the passage of aquatic, semi-aquatic, and terrestrial species. Twin bottomless culverts would be installed at Toll Creek that accommodate the hydraulic potential of the stream and permits the passage of debris. This design option does not meet the I-90 Mitigation Development Team objectives.



Figure 28 Toll Creek CRA Option C

4.1.7. Cedar Creek CRA

Connectivity in the Cedar Creek CRA will be improved by constructing two culverts that accommodate stream flow and permit the passage of debris.



Figure 29 Cedar Creek CRA Option

4.1.8. Telephone Creek CRA

Connectivity in the Telephone Creek CRA will be improved by constructing a culvert that accommodates stream flow and permits the passage of debris



Figure 30 Telephone Creek CRA Option

4.1.9. Hudson Creek Vicinity CRA

On some options, bridges would provide for channel migration, wetland connectivity, and the movement of aquatic, semi-aquatic and terrestrial species. Culverts would also be used to convey water through the roadbed. The restoration options below offer solutions for improving connectivity within the Hudson Creek Vicinity CRA.

Hudson Creek Area Option A:

Option A would construct twin two-span bridges (approximately 230-feet long) that provide at least 10-feet of vertical clearance over a tributary to Hudson Creek. Two hydrologic connectivity zones were identified in this area. Methods for conveying groundwater within these zones will be determined after further investigation and analysis. This design option meets the I-90 Mitigation Development Team objectives.



Figure 31 Hudson Creek Vicinity CRA Option A

Hudson Creek Area Option B:

Option B would construct twin single-span bridges (approximately 120-feet long) that provide at least 10-feet of vertical clearance over a tributary to Hudson Creek. Three hydrologic connectivity zones were identified in this area. Methods for conveying groundwater within these zones will be determined after further investigation and analysis. This design option meets the I-90 Mitigation Development Team objectives.

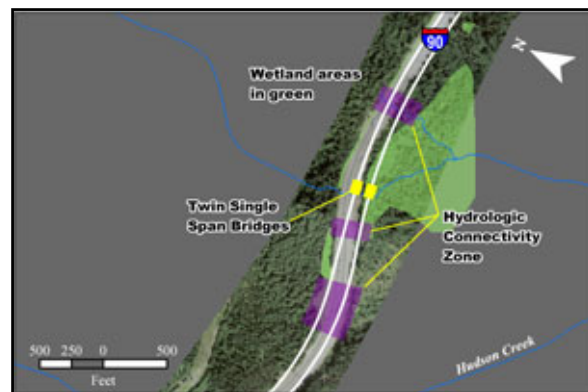


Figure 32 Hudson Creek Vicinity CRA Option B

Hudson Creek Area Option C:

This option would install a culvert (approximately 4-foot square) at the tributary of Hudson Creek. Three hydrologic connectivity zones were identified in this area. Methods for conveying groundwater within these zones will be determined after further investigation and analysis. This design option does not meet the I-90 Mitigation Development Team objectives.



Figure 33 Hudson Creek Vicinity CRA Option C

4.1.10. Easton Hill CRA

Bridges would provide for wetland connectivity and the movement of semi-aquatic and terrestrial species. Methods to convey water through the roadbed will be incorporated within hydrologic connectivity zones. Animal passage across I-90 is especially important in this section of the project. The restoration options below offer solutions for improving connectivity within the Easton Hill CRA.

Easton Hill Area Option A:

Under option A, the westbound alignment would be reconstructed to accommodate a larger radius curve near the top of Easton Hill. A single-span bridge (approximately 120-feet long) with a vertical clearance of at least 10-feet would be constructed on this new alignment over a draw that holds a wetland complex near MP 67.75. The eastbound alignment would be moved southward approximately 100 feet, and a single-span bridge (approximately 120-feet long) with a vertical clearance of at least 15-feet would be constructed on this new alignment over the draw near MP 67.80. This design option meets the I-90 Mitigation Development Team objectives.



Figure 34 Easton Hill Area CRA Option A

Easton Hill Area Option B:

Option B would construct an ecologic connectivity structure over the interstate at MP 67.5. This structure would promote the movement of terrestrial species across the roadway. Methods to promote the movement of both surface and groundwater through the I-90 road prism would be constructed in the westbound lanes near a wetlands complex just east of MP 67.5. This design option meets the I-90 Mitigation Development Team objectives.



Figure 35 Easton Hill Area CRA Option B

Easton Hill Area Option C:

Under option C, the westbound alignment would be reconstructed to accommodate a larger radius curve near the top of Easton Hill. An ecologic connectivity structure would be constructed over the westbound lanes of the interstate at MP 68.0. The eastbound alignment would be moved southward approximately 100 feet, and a single-span bridge (approximately 120-feet long) with a vertical clearance of at least 15-feet would be constructed on this new alignment over the draw near MP 67.80. Methods to promote the movement of both surface and groundwater through the I-90 road prism would be constructed in the westbound lanes near a wetlands complex just east of MP 67.5. This design option meets the I-90 Mitigation Development Team objectives.



Figure 36 Easton Hill Area CRA Option C

4.1.11. Kachess River CRA

Existing bridges provide for the movement of aquatic, semi-aquatic and terrestrial species. The option proposed offers solutions to retain ecological connectivity.

Kachess River Area Option: This option would widen the bridge over the county road at MP 69.0 to accommodate an additional lane in the eastbound direction. The westbound bridge would be widened or replaced with a bridge of the same length. These bridges would continue to provide for the movement of aquatic, semi-aquatic, and terrestrial species.



Figure 37 Kachess River Area CRA Option

4.2. IMPROVEMENT PACKAGES

For purposes of analysis, WSDOT grouped CRA options into Improvement Packages. This enables an analysis of the combined effects of multiple CRA improvements. The Improvement Packages were assembled to represent a varying level of permeability, with Improvement Package A expected to achieve the optimum. Improvement Packages B and C would meet the project need for ecological connectivity at reduced levels. This packaging process also enables the decision-maker to modify any one of the Improvement Packages. Any option could be selected at any given CRA, effectively creating a new package. The specific attributes of each Improvement Package for each Connectivity Restoration Area are presented in Table 2.

Table 2 Improvement Package attributes for each Connectivity Restoration Area

LOCATION	MILE POST		EXISTING STRUCTURE	Improvement Package					
				A		B		C	
Gold Creek West	55.3	Structure Type	Embankment	Single Span Bridge (EB & WB)		No Structure		Single Span Bridge (EB & WB)	
		Length	0 ft.	120 ft. approx.				120 ft. approx.	
		Height	0 ft.	18 ft. min.				12 ft. min.	
		Openness Ratio*	0.00	24.39				18.58	
Gold Creek	55.5	Structure Type	150' bridge	Multi-Span Bridge EB	Multi-Span Bridge WB	Multi-Span Bridge EB	Multi-Span Bridge WB	Multi-Span Bridge EB	Multi-Span Bridge WB
		Length	150 ft.	1100 ft. approx.	900 ft. approx.	1200 ft. approx.	1000 ft. approx.	300 ft. approx.	300 ft. approx.
		Height	30 ft.	30 ft. min.	30 ft. min.	30 ft. min.	30 ft. min.	30 ft. min.	30 ft. min.
		Openness Ratio*	56.25	406.45		430.65		116.13	
Townsend Creek	60.6	Structure Type	6' diam. Corrugated Metal Culvert	Large Span Bottomless Culvert		Large Span Bottomless Culvert		Large Span Bottomless Culvert	
		Length	6 ft.	16 ft. approx.		16 ft. approx.		16 ft. approx.	
		Height	6 ft.	10 ft. approx.		10 ft. approx.		10 ft. approx.	
		Openness Ratio*	0.24	2.13		2.13		2.13	
Price/Noble Vicinity West	60.9	Structure Type	2' Culvert	Single Span Bridge (EB & WB)		Single Span Bridge (EB & WB)		Single Span Bridge (EB & WB)	
		Length	2 ft.	120 ft. approx.		120 ft. approx.		120 ft. approx.	
		Height	2 ft.	18 ft. min.		18 ft. min.		18 ft. min.	
		Openness Ratio*	0.03	25.20		25.20		25.20	
Price Creek	61.3	Structure Type	10' box culvert	Multi-Span Bridge (EB & WB)		Multi-Span Bridge (EB & WB)		Single Span Bridge (EB & WB)	
		Length	10 ft.	800 ft. approx.		800 ft. approx.		120 ft. approx.	
		Height	10 ft.	18 ft. min.		9 ft. ave. 13' at creeks		13 ft. min.	
		Openness Ratio*	0.45	229.20		116.10		18.20	
Noble Creek	61.4	Structure Type	4' diam. Corrugated Metal culvert	Multi Span Bridge for Price Creek Also Spans Noble Creek		Multi Span Bridge for Price Creek Also Spans Noble Creek		Single Span Bridge (EB & WB)	
		Length	4 ft.					120 ft. approx.	
		Height	4 ft.					13 ft. min.	
		Openness Ratio*	0.06					18.20	
Price/Noble Vicinity East **	61.8	Structure Type	2' diam. culverts	Multi-Span Bridge (EB & WB)		Hydrologic Connectivity Zone		Hydrologic Connectivity Zone	
		Length	2 ft.	800 ft. approx.		0 ft.		0 ft.	
		Height	2 ft.	1 ft. min.		0 ft.		0 ft.	
		Openness Ratio*	0.02	13.30		0.00		0.00	
Bonnie Creek West Fork	62.2	Structure Type	2' diam. Corrugated Metal culvert	Multi-Span Bridge (EB & WB)		Hydrologic Connectivity Zone		Hydrologic Connectivity Zone	
		Length	2 ft.	600 ft. approx.		0 ft.		0 ft.	
		Height	2 ft.	20 ft. min.		0 ft.		0 ft.	
		Openness Ratio*	0.04	186.67		0.00		0.00	
Bonnie Creek East Fork *	62.3	Structure Type	6' X 6' box culvert	Multi Span Bridge Spans Both West and East Forks		Multi-Span Bridge (EB & WB)		Large Span Bottomless Culvert	
		Length	6 ft.			250 ft. approx.		15 ft. approx.	
		Height	6 ft.			12 ft. min.		10 ft. min.	
		Openness Ratio*	0.24			45.20		2.00	
Swamp Creek**	62.8	Structure Type	8' double box	Multi-Span Bridge (EB & WB)		Single Span Bridge (EB & WB)		Single Span Bridge (EB & WB)	
		Length	16 ft.	250 ft. approx.		120 ft. approx.		120 ft. approx.	
		Height	6 ft.	15 ft. min.		12 ft. min.		12 ft. min.	
		Openness Ratio*	0.54	39.29		19.20		19.20	
Swamp Creek Vicinity East	63.3	Structure Type	18" diam. culvert	Single Span Bridge (EB & WB)		Single Span Bridge (EB & WB)		Hydrologic Connectivity Zone	
		Length	1.5 ft.	120 ft. approx.		120 ft. approx.		0 ft.	
		Height	1.5 ft.	10 ft. min.		10 ft. min.		0 ft.	
		Openness Ratio*	0.02	11.90		11.90		0.00	
Toll Creek Vicinity West	63.6	Structure Type	8' X 8' box culvert	Single Span Bridge (EB & WB)		Single Span Bridge (EB & WB)		Large Span Bottomless Culvert	
		Length	8 ft.	120 ft. approx.		120 ft. approx.		15 ft. approx.	
		Height	7 ft.	15 ft. min.		15 ft. min.		12 ft. min.	
		Openness Ratio*	0.26	22.50		22.50		2.40	


Table 2 Continued. Improvement Package attributes for each Connectivity Restoration Area

LOCATION	MILE POST	EXISTING STRUCTURE		Improvement Package		
			A	B	C	
Toll Creek	64.2	Structure Type	4' diam. conc. culvert	Culvert	Culvert	Culvert
		Length	4 ft.	6 ft. approx.	6 ft. approx.	6 ft. approx.
		Height	4 ft.	5 ft. approx.	5 ft. approx.	5 ft. approx.
		Openness Ratio*	0.08	0.13	0.13	0.13
Cedar Creek	64.6	Structure Type	4' box culvert	Culvert	Culvert	Culvert
		Length	4 ft.	4 ft. approx.	4 ft. approx.	4 ft. approx.
		Height	4 ft.	4 ft. approx.	4 ft. approx.	4 ft. approx.
		Openness Ratio*	0.11	0.20	0.20	0.20
Telephone Creek	65.6	Structure Type	5' X 4' box culvert	Culvert	Culvert	Culvert
		Length	5 ft.	4 ft. approx.	4 ft. approx.	4 ft. approx.
		Height	4 ft.	4 ft. approx.	4 ft. approx.	4 ft. approx.
		Openness Ratio*	0.13	0.11	0.11	0.11
"Hudson Creek Vicinity West"	66.9	Structure Type	1' conc. Culvert	Hydrologic Connectivity Zone	Hydrologic Connectivity Zone	Hydrologic Connectivity Zone
		Length	1 ft.	0 ft.	0 ft.	0 ft.
		Height	1 ft.	0 ft.	0 ft.	0 ft.
		Openness Ratio*	0.01	0.00	0.00	0.00
"Hudson Creek Vicinity East"	67.2	Structure Type	2' diam. conc. culvert	Multi-Span Bridge (EB & WB)	Single Span Bridge (EB & WB)	Culvert
		Length	2 ft.	250 ft. approx.	120 ft. approx.	4 ft. approx.
		Height	2 ft.	10 ft. min.	10 ft. min.	4 ft. min.
		Openness Ratio*	0.03	31.94	13.89	0.09
Easton Hill	67.5	Structure Type	Embankment	Single Span Bridge (EB & WB)	Animal Over crossing Structure (EB & WB)	Single Span Bridge EB Animal Over crossing Structure WB
		Length	0 ft.	120 ft. approx.	150 ft. approx.	120 ft. approx. 150 ft. approx.
		Height	0 ft.	10 ft. min.	100 ft. **	15 ft. min. 100 ft. **
		Openness Ratio*	0.00	13.89	60.00	18.75
Lake Kachess Area	69.5	Structure Type	100' bridge	Widen Existing Bridge	Widen Existing Bridge	Widen Existing Bridge
		Length	100 ft.	100 ft. approx.	100 ft. approx.	100 ft. approx.
		Height	17 ft.	17 ft. min.	17 ft. min.	17 ft. min.
		Openness Ratio*	35.42	23.61	23.61	23.61
Total Openness Ratio		35.77	69.88	97.94	42.89	

EB – east bound WB – west bound

*Openness Ratio is defined as opening area divided by the width of roadway (L x H / W). It provides a comparison of "openness" between alternatives

** Assigned a maximum height of 100 feet for animal over crossing structures for comparative purposes



The dimensions shown are approximate, and were developed for preliminary evaluation and assessment of impacts. Actual bridge and culvert sizes will vary, depending on the topography and intended purpose of the structure.

Bottomless culverts will be included at locations where fish passage is required, and will be designed using standards required by the Washington State Dept. of Ecology and Washington State Dept. of Transportation.

Bridges or culverts will be used in non-fish bearing streams and will be designed to the appropriate hydraulic standards.



The goal of Improvement Package A is to restore connectivity to a level that facilitates the relative movement of all species under the highway with a high degree of confidence. This package features long bridges with enough clearance to allow for the establishment and growth of plants. The growth of plant communities under the bridges would encourage even low-mobility species to successfully pass under the highway.

In contrast, Improvement Package C attempts to restore connectivity to a level that facilitates the relative movement of all species, but at a reduced cost and with a lower degree of confidence. Package C features smaller bridges combined with large culverts; the culverts would be strategically placed within each CRA to promote connectivity to the fullest extent possible. Because most plants would not be able to establish and grow within these structures, low mobility species would be less successful at moving under the highway. Furthermore, animals in general may not find and/or voluntarily pass through these smaller structures. Similar structures have been used elsewhere in the country to move targeted species across roadway barriers with various degrees of success. It is likely that enough individuals of each species will successfully cross the highway, intentional or not, to maintain minimal genetic viability of species north and south of the interstate.

Improvement Package B would provide connectivity at a higher level of confidence than Package C, but less than Package A.

5. METHODOLOGY AND COORDINATION

5.1. EVALUATION CRITERIA

This study complies with the guidelines outlined in the WSDOT *Environmental Procedures Manual*, Section 4-9, “Expertise Reports,” and Section 5-1-1, “NEPA EIS Outline.” Visual quality assessments were conducted in accordance with the United States Department of Transportation (USDOT), Federal Highway Administration (FHWA) *Visual Impact Assessment for Highway Projects*, 1988.

5.1.1. Visual Quality

Visual quality is inherently subjective; therefore, objective descriptions are used to quantify the visual assessment. Three criteria used to perform an evaluative appraisal of the landscape visual quality are: vividness, intactness, and unity. Expert evaluation based on the three criteria have proven to be good predictors of the visual quality using the following sample equation:

$$\text{Visual Quality} = \frac{\text{Vividness} + \text{Intactness} + \text{Unity}}{3}$$

Each of the three criteria is independent; each is intended to evaluate one aspect of visual quality. Definitions of these terms are:

Vividness: The memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern.

Intactness: The integrity of visual order in the natural and man-built landscape, and the extent to which the landscape is free from visual encroachment.

Unity: The degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or inter-compatibility between landscape elements.

5.1.2. Visual Quality Evaluation

5.1.2.1. Overview

A visual quality evaluation was conducted on I-90 between MP 55.10 and MP 70.1 for the existing and proposed roadway. Pictures were taken, and rating sheets were filled out in October 2001. Data from this evaluation can be found in Appendix A.

5.1.2.2. Rating Scale

Vividness ratings:

Very High (Rating value = 7): The visual impression received is highly memorable, as contrasting landscape elements combine to form distinctive visual patterns. Strongly defined landscape or landforms are noted, including mountains, large bodies of water, distinctive patterns, colors, and textures of vegetation or significant manmade structures.

Medium Rating (Rating value = 4): The visual impression received is moderately memorable, with some distinctive patterns; moderately defined landscape or landforms are

present, including low rolling hills, and smaller water bodies. Vegetation patterns, colors, and textures are less visible. Some significant manmade structures may be present.

Very Low Rating (Rating value = 0): The visual impression received is of low memorability. Little visual pattern is formed because landscape elements do not combine to form a striking and distinctive pattern. Homogeneous landforms or landscapes and small bodies of water may be present. Vegetation patterns, colors, and textures are not noticeable, and manmade structures are insignificant or not memorable.

Intactness Ratings:

Very High (Rating value = 7): There is a high visual integrity between the natural and manmade landscape to the extent that the landscape is free from visual encroachment. Visual integrity occurs where natural areas and manmade landscapes blend into the surrounding character, and create no visual discontinuity between the natural and manmade elements. Natural and manmade patterns are not disturbed, and they maintain visual order.

Medium (Rating value = 4): There is an average visual integrity between the natural and manmade landscape. Some visual encroachment on to the landscape is present, and it lacks visual order. There is some disruption of the natural and manmade patterns.

Very Low (Rating value = 0): There is low visual integrity between the natural and manmade landscape features. Visual encroachment onto the landscape is very apparent. The pattern of elements is disrupted, and the integrity of the natural visual order is lost.

Unity Ratings:

Very High (Rating value = 7): The visual elements of the landscape join together to form a highly coherent, harmonious visual pattern. Manmade and natural elements blend together.

Medium (Rating value = 4): The visual elements of the landscape join to form a moderately coherent, harmonious visual pattern. Manmade elements blend with natural elements, but the visual order is disrupted.

Very Low (Rating value = 0): Visual resources do not join together to form a coherent, harmonious visual pattern. Manmade elements do not have a visual relationship to natural landforms or land cover patterns, and visual order is lacking.

5.2. COORDINATION WITH AGENCIES AND JURISDICTIONS

The project corridor passes through USFS managed land. A map of the ownership along the project corridor can be found in Appendix E. WSDOT is coordinating with the USFS on Architectural Guidelines for the I-90 Snoqualmie Pass East corridor. In addition, WSDOT coordinates with the USFS on plant selection and location, and the collection of native seeds for the purpose of roadside revegetation and restoration within the project limits.

WSDOT is also coordinating with the Mountains-to-Sound Greenway Trust so that the visual elements of the project will complement this portion of I-90's status as a National Scenic Byway. The Scenic Byway Program is described below:

Under the National Scenic Byways Program, the U.S. Secretary of Transportation recognizes certain roads as National Scenic Byways or All-American Roads based on their

archaeological, cultural, historic, natural, recreational, and scenic qualities. There are 72 such designated byways in 32 states. The Federal Highway Administration promotes the collection as America's Byways.

America's Byways are a distinctive collection of American roads, their stories and treasured places. They are roads to the heart and soul of America. Byways are exclusive because of their outstanding qualities, not because byways are confined to a select group of people.

Managing the intrinsic qualities that shape and interpret the byway's story are equally important in improving the quality of the visitors' experience. The National Scenic Byways Program is a voluntary, grassroots program. It recognizes and supports outstanding roads. It provides resources to help manage the intrinsic qualities within the broader byway corridor to be treasured and shared.

To be designated as a National Scenic Byway, a road must possess at least one of the six intrinsic qualities. The significance of the features contributing to the distinctive characteristics of the corridor's intrinsic qualities must be recognized throughout the multi-state region.²

The Mountains-to-Sound Greenway Trust, in conjunction with WSDOT's Northwest Region, developed a Corridor Master Plan and an Implementation Plan. Concepts and goals of these plans are an important consideration in this assessment. It is important to the success of this project to collaborate with the Mountains-to-Sound Greenway Trust to implement their Corridor Management Plan, and to explore opportunities for creative partnerships for selected project components, such as viewshed management, safety rest area development, and interpretation.

In addition, the Mountains-to-Sound Greenway is also a Washington State Scenic Byway. The Scenic Byway designations for the Mountains-to-Sound Greenway are based upon the route's "scenic character, intrinsic qualities, recreational opportunities, and general environmental experiences that exist along this heavily traveled route."³ Because both designations are based upon scenic character, intrinsic qualities, and environmental experiences, any changes in the corridor must be careful to retain those qualities. A primary goal of the Mountains-to-Sound Greenway Trust is to retain or add visual separation between eastbound and westbound lanes of traffic⁴.

6. AFFECTED ENVIRONMENT

The Mountains-to-Sound Greenway begins in Seattle and runs to Thorp (MP 101) along I-90. The study area begins just east of Snoqualmie Pass in the Cascade mountain range. I-90 runs in a north-south direction between the eastern shore of Keechelus Lake and Keechelus Ridge, which rises approximately 2,500 feet above the roadway elevation of 2,700 feet above sea level, on average. The principle land manager through the project corridor is the USDA Forest Service (USFS).

One of the predominant views in the study area is of Keechelus Lake. There are also numerous views of conifer forests with mountains in the background. There are potential views of the

² http://www.byways.org/travel/byway.html?CX_BYWAY=2228&CX_STATE=WA

³ Mountains-to-Sound Greenway Implementation Plan, Volume I. P 1-6. 1998

⁴ Mountains-to-Sound Greenway Implementation Plan, Volume III. P 6. 1998

Kachess Lake valley. The Silver fir (*Abies amabilis*) community near Hyak transitions into a Western Hemlock (*Tsuga heterophylla*) community from near MP 61. At the top of Easton Hill (MP 68), the plants transition into a Grand fir (*Abies grandis*) community until the project end at MP 70.3. These communities represent the “climax” species for these locations. Douglas fir (*Pseudotsuga menziesii*), an early successional species, currently dominates existing vegetation.

The project area runs through public lands that are managed for multiple objectives, including habitat, ecological connectivity, and recreation. Recent land transfers have moved Public Land Survey Sections from private ownership to USFS management, thus protecting viewsheds within the project corridor for the future.

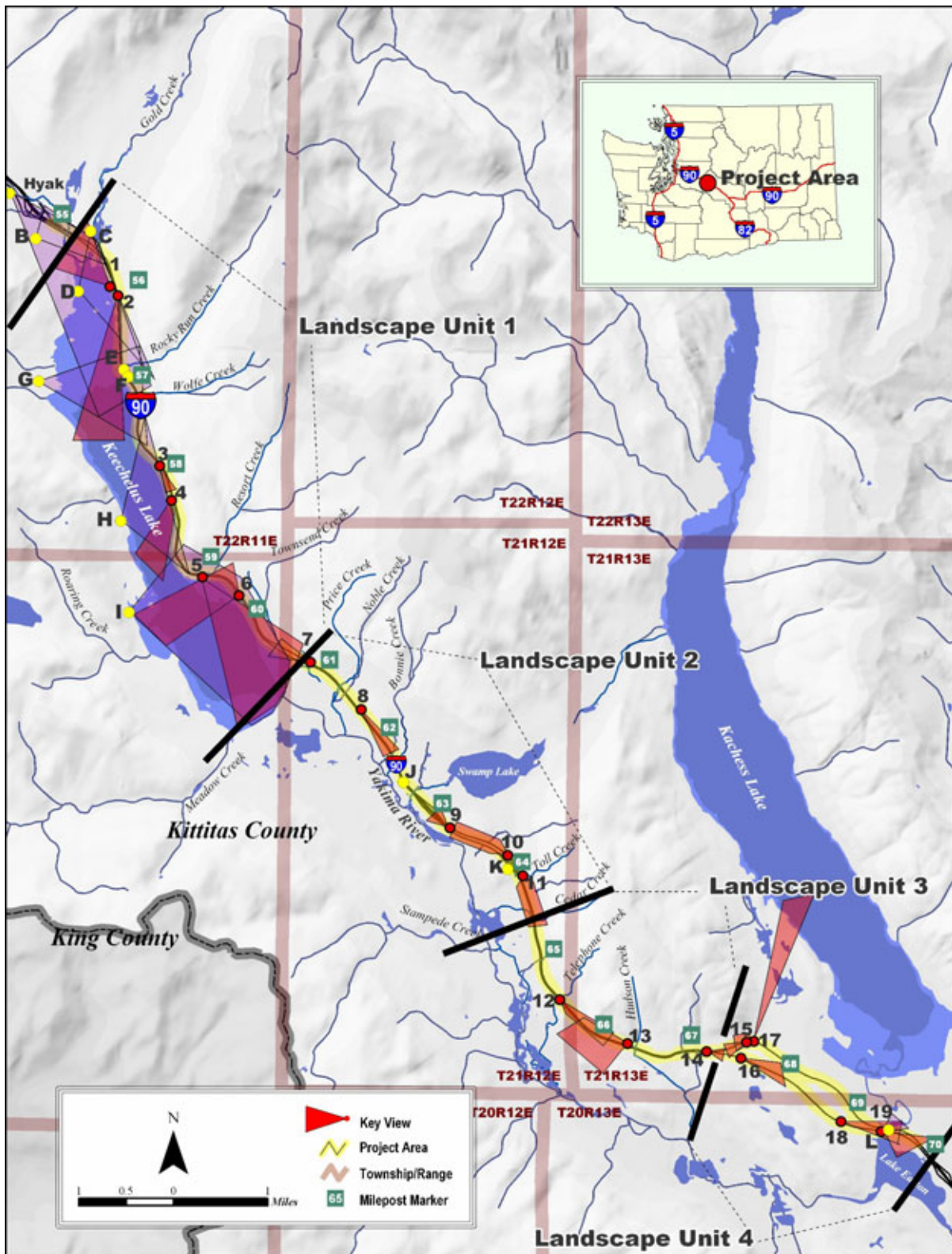
WSDOT’s *Roadside Classification Plan* classifies the entire project area as “Forest.” This classification is characterized as predominantly natural or naturalized forest, with natural-appearing landforms and native trees or understory vegetation. The zone near the roadway edge may be meadow.

6.1. LANDSCAPE UNITS

The study area was divided into four Landscape Units based on topography and views that have similar characteristics. The four Landscape Units are listed below by Milepost:

- Landscape Unit 1 – MP 55.10 to MP 60.75
- Landscape Unit 2 – MP 60.75 to MP 64.41
- Landscape Unit 3 – MP 64.41 to MP 67.46
- Landscape Unit 4 – MP 67.46 to MP 70.30

Figure 38 shows the project corridor with each of the Landscape Units and the Key Views within them. Triangles depict approximate views from each location.



6.1.1. Landscape Unit 1 – MP 55.10 to MP 60.75

Landscape Unit 1 runs from the western project limits along the entire eastern shore of Keechelus Lake. The view from the road is of a sharp rise to the east, the lake, and distant mountains. The dominant landscape character in this unit is openness. Views across Keechelus Lake and up the Gold Creek Valley draw the eye away from the road. The road follows the sinuous curve of the shoreline. The traveler can see Gold Creek as it flows into the lake at the northern end of the Landscape Unit. This is the only Landscape Unit with extensive views toward the road. Typical topography is seen in Figure 39.

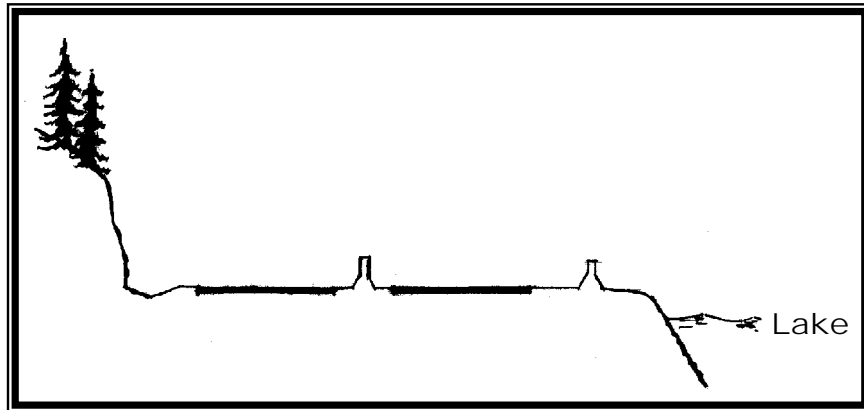


Figure 39 Typical Topography in Landscape Unit 1

The John Wayne Pioneer Trail, a part of the Iron Horse State Park, runs along the western shore of Keechelus Lake and has views toward I-90. There are brief views of the road from Forest Service Road (FS Road) 4832, which runs parallel and above I-90 to the east, in the vicinity of Gold and Rocky Run Creeks. Located off this road are the Gold Creek Sno-park, the Rocky Run Historic Campsite, and summer homes. Currently, concrete barriers form the median between the two lanes of traffic. Figure 40 shows the view at MP 58.



Figure 40 Topography at MP 58 – the Snowshed

6.1.2. Landscape Unit 2 – MP 60.75 to MP 64.41

Landscape Unit 2 is defined by broad, relatively flat topography as the road runs along the eastern side of the narrow valley formed by the Yakima River. Here the landscape allows a wide median between the eastbound and westbound lanes of traffic. Typical topography is shown in Figure 41.

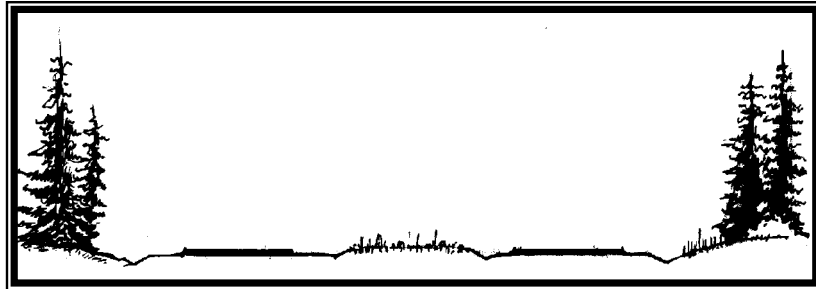


Figure 41 Typical Topography in Landscape Unit 2

The dominant landscape characteristic in Landscape Unit 2 is of a forested foreground. The road here feels safer because of the wide median and the forested enclosure on both sides of the roadway. The Douglas fir-dominated forest encloses the road and reveals mountain views ahead, as shown in Figure 42.

FS Road 4823 runs briefly along the west side of I-90 south of the Cabin Creek Interchange, and the Cabin Creek Sno-park is located just off I-90. Currently, this road serves a few homes and recreational facilities. FS Road 4823 dead-ends at the Yakima River.



Figure 42 Typical Topography along Landscape Unit 2

6.1.3. Landscape Unit 3 – MP 64.41 to MP 67.46

Landscape Unit 3 runs along the southwestern flank of Amabilis Mountain before it descends to the Yakima River. Its topography is similar to that of Landscape Unit 1, with a rise to the northeast and a valley to the southwest. Figure 43 shows topography typical of this Landscape Unit as seen from the westbound lanes.

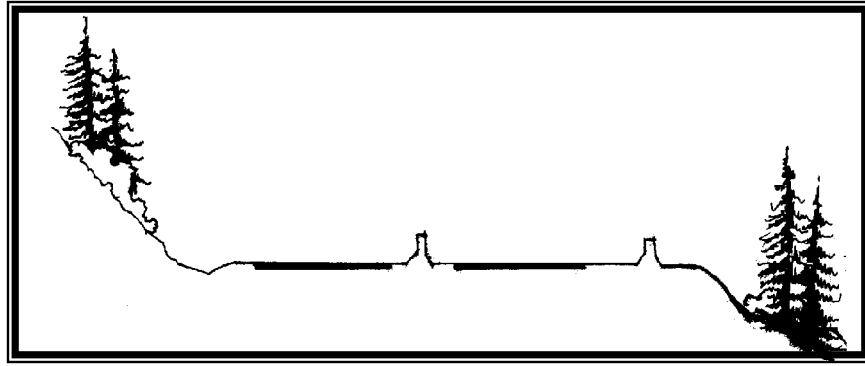


Figure 43 Typical Topography in Landscape Unit 3

The character of Landscape Unit 3 is mixed. There are steep cut rock faces and forested foreground views. The road curves sinuously with only a Jersey barrier separating the directions of traffic. Electrical transmission lines run parallel to the road to the southwest. These lines lie approximately 400 feet from I-90. There are no significant views toward the road within this Landscape Unit. The westbound view from the roadway, typical of this Landscape Unit, is seen in Figure 44.



Figure 44 Topography in Landscape Unit 3

6.1.4. Landscape Unit 4 – MP 67.46 to MP 70.30

Landscape Unit 4 runs along a plateau south of Kachess Lake. There is room for a wide median, which forms a heavily forested hill between the two directions of traffic. This is shown in Figure 45.

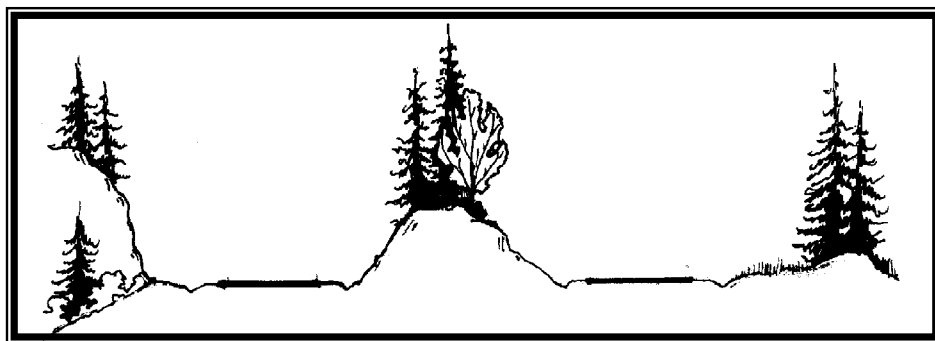


Figure 45 Topography Typical of Landscape Unit 4

This Landscape Unit forms the southeastern entry into the project area and is the eastern entry into the forests of western Washington. In this Landscape Unit, the Grand fir plant association is the climax plant community. Figure 46 shows a typical view of this Landscape Unit. There is a secure feeling driving through this area because of the wide median and the enclosure of the forest on both sides of the roadway. Mountain views are seen straight ahead, in the distance. There are views toward the roadway from Lake Easton State Park.



Figure 46 View of Eastbound I-90 in Landscape Unit 4

6.2. KEY VIEWS

6.2.1. View Locations

Views within each of the Landscape Units were selected to examine the visual conditions of the existing project corridor and to assess the visual quality of the roadway. The locations of these “Key Views” have been established to optimally analyze the change in visual quality between current and proposed conditions. For example, views were selected where vegetation removal could affect the view from or toward the road, or where the realignment of the road has the potential to change views. Other criteria that may be used for selecting a Key View location include visibility of the project area from the viewpoint, frequency and duration of the public viewing time, and the similarity of the view to a larger portion of the project.

Much of the land within the viewshed of the Mountains-to-Sound Greenway has been bought by or traded to the USFS. The harvested slopes have been planted, and will mature and provide enhanced views within the next 20 years. The analysis of views for this study rates these harvested slopes as they are now, but ratings for vividness of vegetation, intactness, and unity are expected to improve as the forests mature. Rating sheets for these views can be found in Appendix A.

6.2.2. Landscape Unit 1 – Views from the Road – MP 55.10 to 60.75

The map in Figure 47 shows the locations of Key Views from the road. These views were chosen based upon their representation of the various, typical views along Keechelus Lake. In addition, the views from these locations could depict probable changes in the view from the road caused by project alternatives. Key Views are numbered north to south along the project corridor. Because of Keechelus Lake, views in this Landscape Unit are broad, and the background view is typically miles away from the viewer.

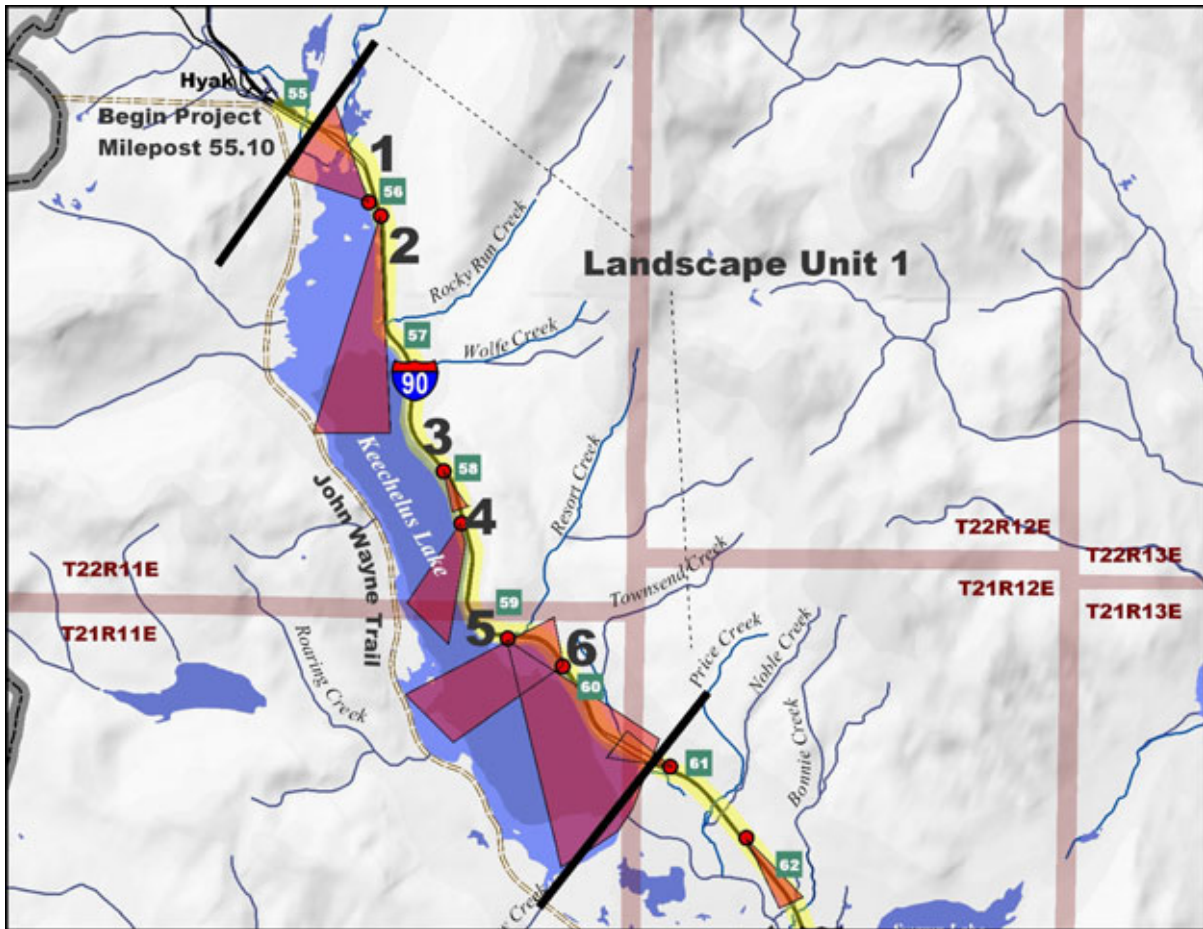


Figure 47 Landscape Unit 1 – Key Views From the Road

The highway curves sinuously along the lakeshore with views of Keechelus Lake and forested slopes. Views in Landscape Unit 1 vary with the seasons, and depend upon depth of snow pack and spring runoff. In 2001, when these photos were taken, the lake elevation was at a 50-year low. Average change in elevation of Keechelus Lake is 80 feet. When the lake level is high, all the stumps are covered, and water is visually very close to the highway. High lake levels increase the scenic quality of Landscape Unit 1.

Because of the rapid change in lake elevation annually, vegetation does not become established on the lower fill slopes. This situation is determined by water needs downstream in the Yakima River watershed and is not expected to change.

6.2.2.1. Key View 1 – MP 56 – Westbound – Gold Creek CRA

Key View 1 looks northwest, toward Gold Creek and the ski slopes at Snoqualmie Summit. The existing view, shown in Figure 48 includes the chain-off lanes and lighting provided for that activity. The chain-off area, Jersey barrier and vegetation on the shoulder form the foreground view. Vegetation on the bench above the lake and Gold Creek are in the middleground view. The ski slope and mountains beyond form the background view.



Figure 48 Key View 1 - Westbound MP 56

With its view of mountains, ski slopes, and Gold Creek, this area is memorable, especially during the ski season with its lighted slopes for night skiing. This key view has a moderate vividness rating. This view shows that there is some development and that development encroaches to a slight degree. Intactness is rated as moderate. The highway and the cleared areas of the ski slopes interrupt the visual unity of the scene. Overall unity is rated as moderate. Total visual quality for this view is moderately high.

6.2.2.2. Key View 2 – MP 56 Eastbound

Key View 2 has a foreground view of the road. Middleground views are of cottonwood and Douglas fir trees, shrubs, grasses, and near lake or lakebed views. Background views are of Keechelus Lake, the opposite shore, distant hills, and the mountains beyond. This is a popular place for trucks and visitors to stop because of the shoulder width, and because it is the first opportunity to view the lake and the only place to stop along its eastern shore. This view can be seen in Figure 49.



Figure 49 Key View 2 – MP 56 – Eastbound

The view is memorable and has a high degree of vividness. The road is the principle development within the viewshed. Beyond the road, the view is relatively intact. Its intactness rating is moderately high. This key view has a moderately high degree of unity. Total visual quality for this view is high.

6.2.2.3. Key View 3 – MP 57.5 – Eastbound

Existing views, seen in Figure 50, are of the snowshed over the westbound lanes of traffic, and of trees between Keechelus Lake and the highway. Vegetation consists of grasses on the right-hand shoulder. There are Douglas firs and native cottonwoods between the road and the lakeshore. Trees, consisting of Douglas firs and cottonwoods, are growing on top of the snowshed and on the slope above the steep rock cut along the highway to the left. The foreground view is of the roadway and the median Jersey barrier. Middleground views are of the trees between the road and the lakeshore. Background views are of the snowshed and hills beyond.



Figure 50 Key View 3 – MP 57.5 – Eastbound

This view too is somewhat memorable because of the historic snowshed. It has an average vividness rating because of the lack of water in the view. The road and the snowshed are the principle developments within the viewshed. Beyond the road, the view is relatively intact; therefore, this view has a moderately high intactness rating. This key view has an average unity rating because of the steep, unvegetated slopes to the left of the highway. Total visual quality for this view is moderately high.

6.2.2.4. Key View 4 – MP 58.5 – Eastbound

Existing views at this key viewpoint are of rocks rising sharply on the left, the road seeming to point directly into the mountainside, and of Keechelus Lake to the right. This is a dramatic view because of the contrast in textures from rock and vegetation to water. Foreground views are of the highway, the rock, and the Jersey barriers in the median and along the right shoulder. Douglas fir trees dominate vegetation here, and provide some screening between the highway and the lake. This view can be seen in Figure 51.



Figure 51 Key View 4 – MP 58.5 – Eastbound

Because of the difference in texture, the lake, and mountain views, this scene has a high vividness rating. The only development in the scene is the highway; therefore, this key view has a high intactness rating. It also has a high unity rating. Total visual quality at this view is very high.

6.2.2.5. Key View 5 – MP 59.35 – Eastbound

The southern end of Keechelus Lake dominates this view. The road and Jersey barrier occupy the foreground. The middleground is of grasses between the road and the lake, and of cottonwoods and Douglas firs on the left side of the road. Keechelus Dam can be seen in the background, as well as the mountains in the far distance. Beyond the dam, the Yakima River flows south to eventually join the Columbia River far beyond the project limits. Figure 52 shows Key View 5.



Figure 52 Key View 5 – MP 59.35 – Eastbound

This view has a moderately high-to-high degree of vividness. Keechelus Lake makes this scene memorable. The road and Keechelus Dam are the two obviously manmade elements in this scene. While the dam represents development, its low profile relative to the surrounding landscape allows

it to blend. This view is moderately high to highly intact. Its unity rating is moderately high because the Jersey barriers abruptly separate the viewer from the scene. Total visual quality at this view is high to very high.

6.2.2.6. Key View 6 – MP 59.85 – Westbound

This Key View looks north along Keechelus Lake on westbound I-90. The lake is to the left, and the southern side of Slide Curve is directly ahead. The foreground is occupied by the highway and by vegetation to the right. Native grasses occupy the road shoulder, and young Douglas fir trees and cottonwoods are growing on the eastern slope. The lake, highway, and vegetation on the right occupy the middleground. Slide Curve and the mountains to the northwest of Keechelus Lake are in the background. This view can be seen in Figure 53.



Figure 53 Key View 6 – MP 59.85 – Westbound

This view has contrasting topography (mountains, hills, and the lake), but the contrasts are not dramatic. The view of Keechelus Lake enhances its vividness rating, making it moderately high. Development is limited to the highway, transmission lines on the mountain across the lake, and distant logging roads on the mountains. Its intactness rating is moderately high. The overall unity in this scene is high because the road emphasizes and enhances the curve of the shoreline. Total visual quality for this view is high to very high.

6.2.3. Landscape Unit 1 – Key Views Toward the Road – MP 55.10 to MP 60.75

The Key Views toward I-90 in Landscape Unit 1 are from the Snoqualmie Summit ski area, the residences on the slopes above Hyak, the southern boat ramp for Keechelus Lake, Gold Creek Sno-park, Rocky Creek campsites and summer homes, and from the John Wayne Trail. These views were chosen because of the number of potential viewers and the duration of their views. Other views from Forest Service roads were considered, but the limited number of travelers and the narrow view windows limited their usefulness in this study. Figure 54 shows the key views toward the road used in this study.

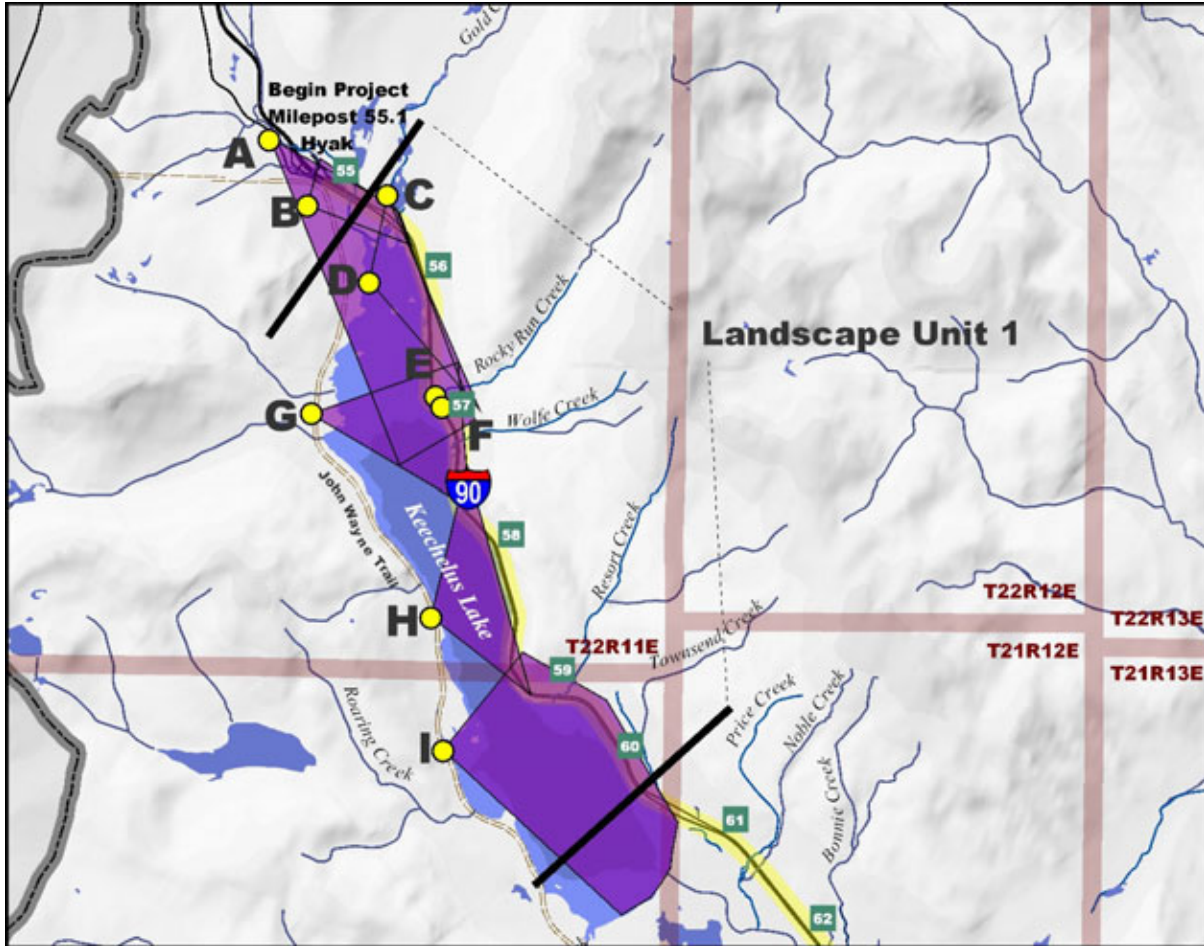


Figure 54 Landscape Unit 1 – Views Toward the Road

6.2.3.1. Key View A – Hyak, Snoqualmie Summit Ski Area – Ripcord Run

Visitors and employees using the ski lifts and ski runs at Snoqualmie Summit and Hyak have views of I-90 ranging from the immediate area of Hyak to distant views of the highway along the lakeshore. Figure 55 shows the near view of Hyak from 100 feet below and to the north of the Ripcord chair lift. The eye catches on the middleground vegetation and then travels to the peaks beyond. The highway in the center of the view is noticeable but does not dominate the view.



Figure 55 Key View A – I-90 from Ski Slopes

This is a memorable view with the mountains in the background, trees in the middleground, and snow-covered slopes in the foreground. It has a high vividness rating. There is development, but it does not encroach upon the scene. The overall unity is high. Total visual quality is high. Distance from development enhances the visual quality. The road is seen as a narrow line in the center of the view.

6.2.3.2. Key View B – Hyak Residences

There are many homes and vacation condos and cabins on the slopes above Hyak. This area also has Nordic ski trails. Residents and visitors to this area have views of the Hyak Interchange and the northern end of the project corridor. Figure 56 is typical of the views of the highway from the slopes above Hyak.



Figure 56 Key View B – From Hyak Residences

The mountains in the background draw the eye. The highway and the development at Hyak, along with the chair lift, form the middleground view. The foreground consists of a house, its yard, and Douglas fir trees. The mountain in the background is covered in a second-growth Douglas fir plant community.

This key view has an average vividness rating because it has a mountain backdrop but lacks a view of the lake. This is the most developed area within view of the project. It has an intactness rating between average and moderate. Its unity rating is moderately high. Total visual quality is moderately high.

6.2.3.3. Key View C – MP 55.5 – Gold Creek CRA and Sno-park

This view is taken from FS Road 4832 over Gold Creek looking south toward the twin bridges of I-90 over Gold Creek as a representative view of the area around the Gold Creek Sno-park. It is an area where recreational users of the Sno-park are likely to stop and admire the view.



Figure 57 Key View C – MP 55.55 – Gold Creek Sno-park

This view has a moderately high-to-high rating because the view of the mountains, and the water is memorable and the bridges do not intercept the view of either of those elements.

6.2.3.4. Key View D – Boat Ramp

This key view was chosen to demonstrate views of the roadway by people launching boats onto Keechelus Lake. Keechelus Lake is open for fishing year round, though people who have fished the lake say the fishing is not good. Foreground views are of the boat ramp and potentially the lake in a high water year. This photo was taken in 2001.



Figure 58 Key View D – Boat Ramp to Keechelus Lake

As seen in Figure 60, middleground views are of Keechelus Lake, with the roadway and the mountains in the background. The road can be seen as a fine line between the lake and the base of the mountains. Trucks and cars are visible as they move along the road. The eye focuses on Keechelus Lake and the mountains.

This scene is made up of natural elements: a foreground view of a large body of water (when Keechelus Lake is high enough to launch a boat), tree-covered mountains, and distant peaks. It has a high vividness rating. The road and the utility corridor are the only notable features of development. It has a high intactness rating. It also has a high unity rating. Total visual quality ratings are very high.

6.2.3.5. Key View E – MP 56.9 – Rocky Run Summer Historic Campsites

This view has a high total visual quality rating because of the vegetation in the foreground, the view of water and the view of the mountains. I-90 has some screening from FS Road 4832 and the campsites near the road by a berm and cottonwood trees. The view is impacted most by the view of the Forest Service road in the middleground.

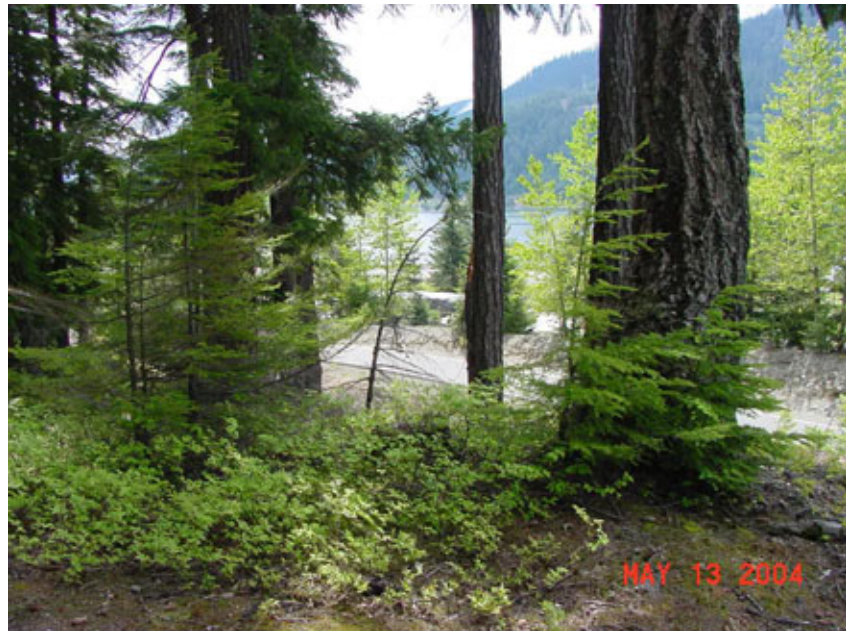


Figure 59 Key View E – MP 56.9 – Rocky Run Summer Historic Campsites

6.2.3.6. Key View F – MP 57.25 – Rocky Run Summer Homes

These homes along FS Road 4832 currently have views of the Forest Service road, I-90, and Keechelus Lake. Manmade elements in the foreground impact the view. Vividness, intactness, and unity ratings are moderately high because of the background views.

The truck in the middleground of Figure 60 is parked in a gravel parking area opposite the access road to the homes. The trees behind the truck provide some screening between I-90 and the Forest Service road.



Figure 60 Key View F – MP 57.25 – Rocky Run Summer Homes

6.2.3.7. Key View G – John Wayne Trail at Cold Creek

This viewpoint is adjacent to a picnic area with pit toilets on the John Wayne Trail, which follows the western shoreline of Keechelus Lake. It is a convenient area for people to stop. The view from this point, seen in Figure 61, is very natural, with Cold Creek and native vegetation in the foreground. In 2001, stumps are in the middleground, which would normally be submerged under the lake surface. In the background are hills and mountains covered with Douglas firs. I-90 runs along the opposite lake shore. In this location, the highway is partially screened by trees.



Figure 61 Key View G – John Wayne Trail at Cold Creek

Key View G, taken from a recreational trail, has a high vividness rating. Keechelus Lake and the mountains beyond combine to make it a memorable scene. Development is limited to the narrow band of the highway, and trees obscure it in several places. Its intactness rating is moderately high-to-high. Its unity score is high. Total visual quality is very high. The only detractors are the obvious, regenerating, clear-cut logging areas. These are filling in and will not be as visible in a few years.

6.2.3.8. Key View H – John Wayne Trail Across from the I-90 Snowshed

This key view is directly across Keechelus Lake from the snowshed on I-90. Figure 62 shows the avalanche chutes that lead to the snowshed. When seen from this perspective, the need for protection of drivers from the active chutes is clear. The foreground of the scene is the near shore water of Keechelus Lake. Middleground is also of the lake. The background view is of the roadway, its fill slope, and the mountain beyond.

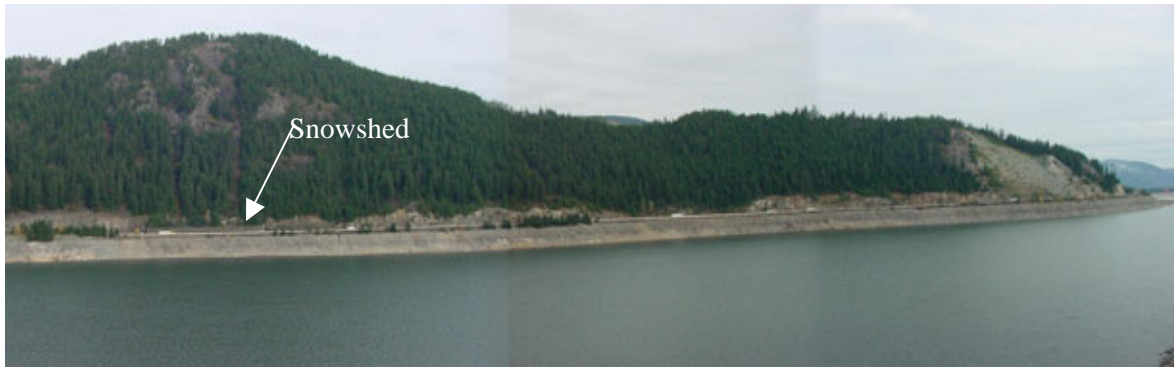


Figure 62 Key View H – Snowshed from John Wayne Trail

The water and the mountain in this view contrast with one another, and make this a scene with a moderately high-to-high vividness rating. The road is the only development in the view. The unvegetated cuts in the rock to provide space for the road make it more visible from this distance than in other portions of the project. The scene has a moderately high intactness rating. The road cut and the visible disruption in the line of the slope lowers the unity rating to moderately high. The total visual quality rating for this view is high.

6.2.3.9. Key View I – John Wayne Trail View of Slide Curve

Views from the John Wayne Trail are sweeping and dramatic, as seen in Figure 63. This view of Slide Curve to the left of center in the background shows the constant erosion that prevents vegetation from becoming established on the slope. Additional background views are of distant peaks. The foreground is occupied by vegetation along and below the trail. The middleground is occupied by the lakeshore.



Figure 63 Key View I – John Wayne Trail View of Slide Curve

This view of the curving lakeshore on the east is dramatic. The mountains in the background and Keechelus Lake in the foreground enhance that drama. This view has a high vividness rating. The highway is seen in the background as a narrow band at the base of the mountains. This scene has a high intactness rating. Visual unity in this view is also high.

6.2.4. Landscape Unit 2 – MP 60.75 to MP 64.41

The transition between Landscape Unit 1 and Landscape Unit 2 occurs at MP 60.75 where the westbound traveler is first able to see Keechelus Lake, and the eastbound traveler leaves the lake view. The topography and the experience of the traveler change at this point. For eastbound traffic, more open views of Keechelus Lake give way to views of the highway enclosed by trees. The mountains still rise to the northeast (left side of the road for eastbound travelers or right side of the road for the westbound traveler), but the land to the southwest flattens out somewhat. There is room for a wider median in this Landscape Unit. Distant views are only seen straight ahead. There are views toward the road from the Crystal Springs Campground. The only other possible views are from distant, seldom used logging roads. The Key Views for this Landscape Unit are shown in Figure 64. Note the difference in the view shapes between Landscape Unit 1 and Landscape Unit 2. (The views narrow down in Landscape Unit 2.)

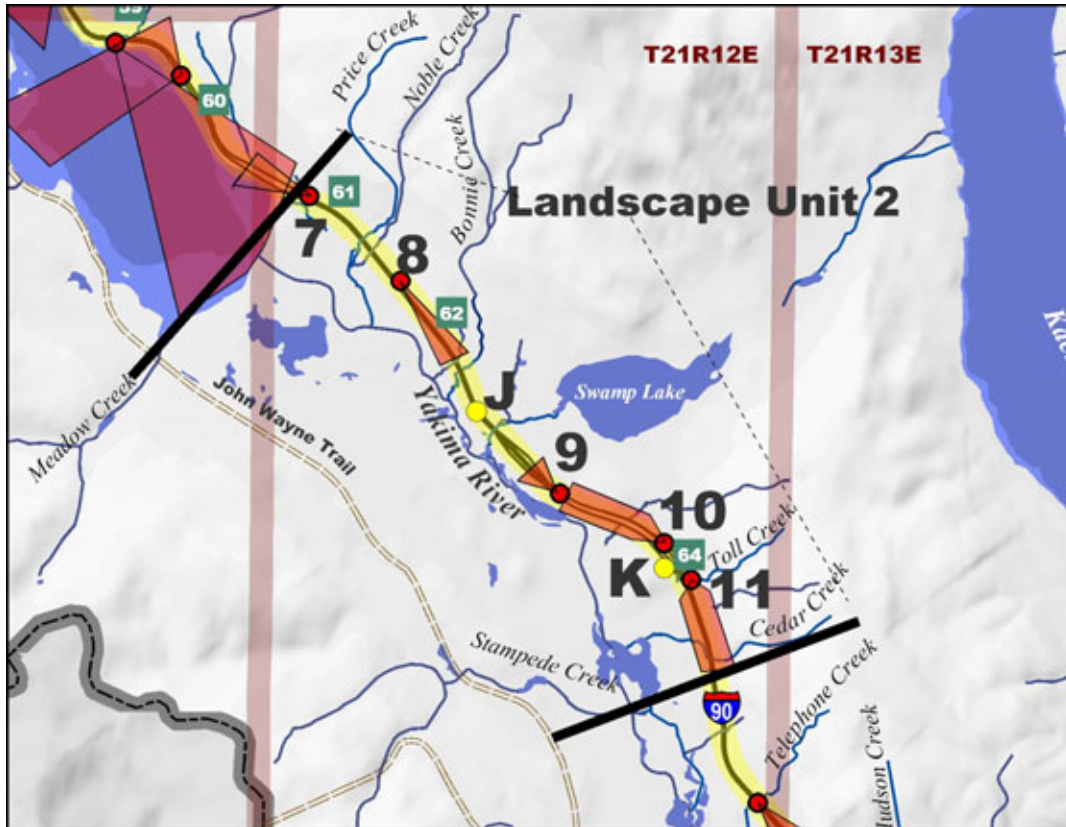


Figure 64 Landscape Unit 2 – Key Views

6.2.4.1. Key View 7 – MP 60.75 – Westbound

Key View 7 is the transition from Landscape Unit 2 to Landscape Unit 1 when traveling westbound on I-90 through the project corridor. At this point, the traveler leaves the enclosure of the trees and can view long distances across Keechelus Lake. This transition, seen in Figure 65, is made more dramatic by the rock cuts on either side of both the eastbound and westbound lanes. Native grasses grow in the foreground. Shrubs and Douglas firs grow in the middleground. The rock cuts are also in the middleground view. Tree-covered mountains form the background view.



Figure 65 Key View 7 – MP 60.75 – Westbound

The landform in this view has a high vividness rating because of the constriction of the road by the rock walls on either side, which then open to a wide expanse. Vegetation is second growth of a medium to young age class. The vividness rating of this scene is average because of the lack of water in the view. The road and the rock cuts are the only signs of development or encroachment. It has a moderately high intactness rating. The overall unity of the view is moderately high. Total visual quality for this view is moderately high to high.

6.2.4.2. Key View 8 – MP 61.75 – Eastbound – Price Creek Vicinity

This Key View illustrates the sense of enclosure provided by second growth forest along the roadside. Douglas firs dominate the forest, with some black cottonwoods interspersed in the middleground. Trees appear to be 50 years or younger in age. Grasses form the foreground on the road shoulder and the median. The topography in this landscape unit allows for a medium width median.



Figure 66 Key View 8 – MP 61.75 – Eastbound – Price Creek Vicinity

This view has an average vividness rating. There are no sharp contrasts between landforms, materials, or water. The road is the only sign of development or encroachment. The intactness rating is moderately high-to-high. The trees and grass on both sides of the road provide a moderately high degree of unity in this view. The total visual quality rating is moderately high to high.

6.2.4.3. Key View 9 – MP 63.2 – Westbound – Stampede Pass Exit

This Key View shows the Stampede Pass Exit. Foreground views are of the highway and roadside vegetation. Middleground views are of trees and the Stampede Pass interchange. Background views are of trees and the mountain slope.

Total visual quality ratings at this location are moderately high. The bridge over I-90 interrupts the view of the mountains and forest somewhat. There are luminaires on the bridge, and at the ends of the on and off ramps which lower ratings for manmade elements and development.



Figure 67 Key View 9 – MP 63.2 – Westbound – Stampede Pass Exit

6.2.4.4. Key View 10 – MP 63.9 – Westbound

Key View 10, seen in Figure 68, shows the westbound lanes with trees filling the median and enclosing the lanes on the right. This enclosure frames the view to the mountains in the background. Grasses, trees, and light standards form the foreground, as well as the middleground views.



Figure 68 Key View 10 – MP 63.9 – Westbound at End of Cabin Creek Road Onramp

This view has a balance of landform, vegetation, and manmade elements. It has a slightly above average vividness rating. There is some development in the form of the road and lighting, but it encroaches only slightly. The intactness rating is moderately high. The overall unity of the view is moderately high. The total visual quality rating is moderately high.

6.2.4.5. Key View 11 – MP 64.1 – Eastbound – Cabin Creek Road Vicinity

Key View 11 has grass and the roadway in the foreground; the ramps, power lines, and Douglas firs and cottonwoods in the middleground; and logged mountains and sky in the background. There is a stand of mature Douglas firs, seen on the right hand side of Figure 69, just south of the eastbound on ramp from Cabin Creek Road. These trees appear to be over 50 years old and are some of the oldest trees in the project corridor.



Figure 69 Key View 11 – MP 64.1 – Eastbound – Cabin Creek Road Vicinity

This view has a forest stand of moderate age, which provides a sense of enclosure to the road. In this particular view, the mountain in the background provides interest to the scene, which has an average vividness rating. There is some development in this view that encroaches because of the power lines and the sparse tree cover on the logged mountain in the background. Its intactness rating is average to moderate. Because of the encroachment, the unity rating of this view is average. Total visual quality ratings here are average to moderately high.

6.2.4.6. Key View J – MP 62.5 – Crystal Springs Campground

Key View J is the view from the vicinity of camping space 16 looking toward an outhouse and toward the highway. For the campground, this would be a relatively high use area. The campground is closed during the late fall to late spring months. The photo in Figure 70 was taken in mid-April 2004 while the campground was still closed. I-90 can be seen as the lighter area in the background. The project will not be widening highway in the direction of the campground; however, if there is disturbance, the project will restore vegetation functions in the area within the right-of-way.



Figure 70 Key View J – Crystal Springs Campground

There are numerous deciduous shrubs between the campground and the highway that would screen the views during the summer and early fall months. Planting evergreen trees and shrubs along the project edges can increase the screening of the road from the campground. Increased use of evergreen species may help slightly to buffer noise levels, if only psychologically.

6.2.4.7. Key View K – MP 64 – Cabin Creek Sno-park

This view has a moderate visual quality rating because of the background views of forest and landform. The view in the foreground of the bare roadway shoulder lowers the vividness, intactness, and unity ratings. This can be seen in Figure 71. Total visual quality ratings at this view are average because of the parking area and bare shoulder.

In the winter when most people see this view, the gravel is covered with snow. At that time, the view would be above average.



Figure 71 Key View K – Cabin Creek Sno-park

6.2.5. Landscape Unit 3 – MP 64.41 to MP 67.46

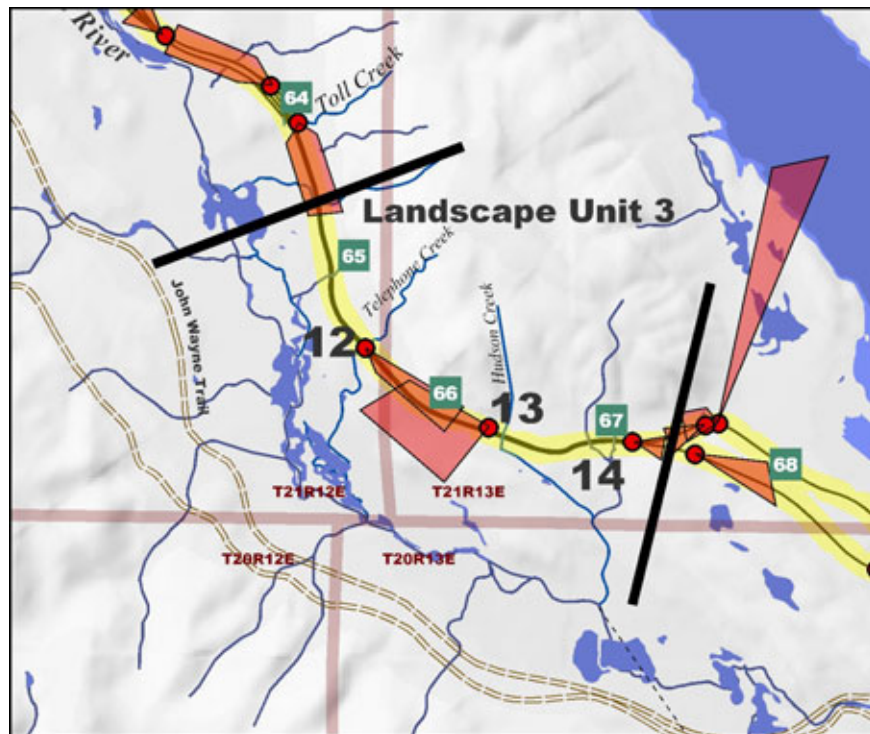


Figure 72 Landscape Unit 3 – Key Views

The transition between Landscape Units 2 and 3 takes place at MP 64.41 where the topography has limited the road width. The land slopes down from the southwest side of the highway. Jersey barriers form the median for this Landscape Unit because of the drop off of the land to the right of the eastbound lanes. A narrow band of second growth Douglas firs and cottonwoods line the southwest slope along I-90 in this area. Transmission lines to the south, owned by Bonneville Power, come within 400 feet of the highway at MP 66. Figure 72 shows Landscape Unit 3 and its Key Views from the roadway.

Key Views in this Landscape Unit were chosen because they represent a critical area in this part of the project corridor – the area closest to the transmission lines.

6.2.5.1. Key View 12 – MP 65.8 – Eastbound

Figure 73, a photo taken from Key View 12, shows Douglas fir and cottonwood trees, the road, and the Jersey barrier median in the foreground. Trees and a transmission tower form the middleground view. Mountains are in the background. The trees screen the majority of the transmission towers and lines from the view of travelers on the road in this location.



Figure 73 Key View 12 – MP 65.8 – Eastbound

Behind the power lines are slopes that have been logged in recent years. Vegetation on these slopes consists of fireweed, vine maple, young cottonwoods, and Douglas fir trees.

The enclosure of the road by trees and the contrast of the trees with the mountain in the distance create an interesting scene. This scene has an average vividness rating. The road and the power transmission lines are signs of development in this scene. The power lines do encroach somewhat. This view has an average to moderately high intactness rating. Its overall unity is moderately high.

6.2.5.2. Key View 13 – MP 66.4 – Westbound

The foreground elements in Key View 13, seen in Figure 74, are the rocky slope to the right, the highway, and the Jersey barriers on either side of the westbound lanes. Douglas firs and cottonwoods form the middleground view. There are glimpses of the power lines between the trees in the middleground view. Mountains, which have been logged in places, form the background view.



Figure 74 Key View 13 – MP 66.4 – Westbound

The mountains visible in the background and the trees in the middleground make this a memorable scene. Its rating is just below average for vividness (because the lack of water in the view lowers the score). There is some development in the scene in the form of the highway and the power lines. Trees screen the power lines except where there are gaps between trees. (Figure 75 shows the power lines behind the trees at MP 66 and is included for information, and was not analyzed as part of this study.) In addition, there are visible logging traces on the mountains in the background. Intactness scores are just above average. Unity in this view is moderately high. Total visual quality rating at Key View 15 is moderately high.



Figure 75 View toward Transmission Lines at MP 66

6.2.5.3. Key View 14 – MP 67.23 – Eastbound



Figure 76 Key View 14 – MP 67.23 – Eastbound

Visual quality ratings are moderately high. The forest encloses the roadway, and forest-covered mountains are seen in the distance, other than I-90 in the foreground, there is little development in the view.

6.2.6. Landscape Unit 4 – MP 67.46 to MP 70.30

The transition between Landscape Unit 3 and Landscape Unit 4 occurs at MP 67.46. This is the top of Easton Hill. I-90 begins sloping down toward Lake Easton. A wide heavily forested median provides an excellent visual buffer between the two directions of traffic. There is also a wide grassy median at the southeastern end of this Landscape Unit. It is at this southeastern end of the project that the Western Hemlock climax community transitions to a Grand Fir forest community. Bonneville Power transmission lines parallel the highway from near MP 69 to MP 67.6. They are most visible where a tower stands above the westbound highway at MP 67.7. Figure 77 shows all the Key Views within Landscape Unit 4.

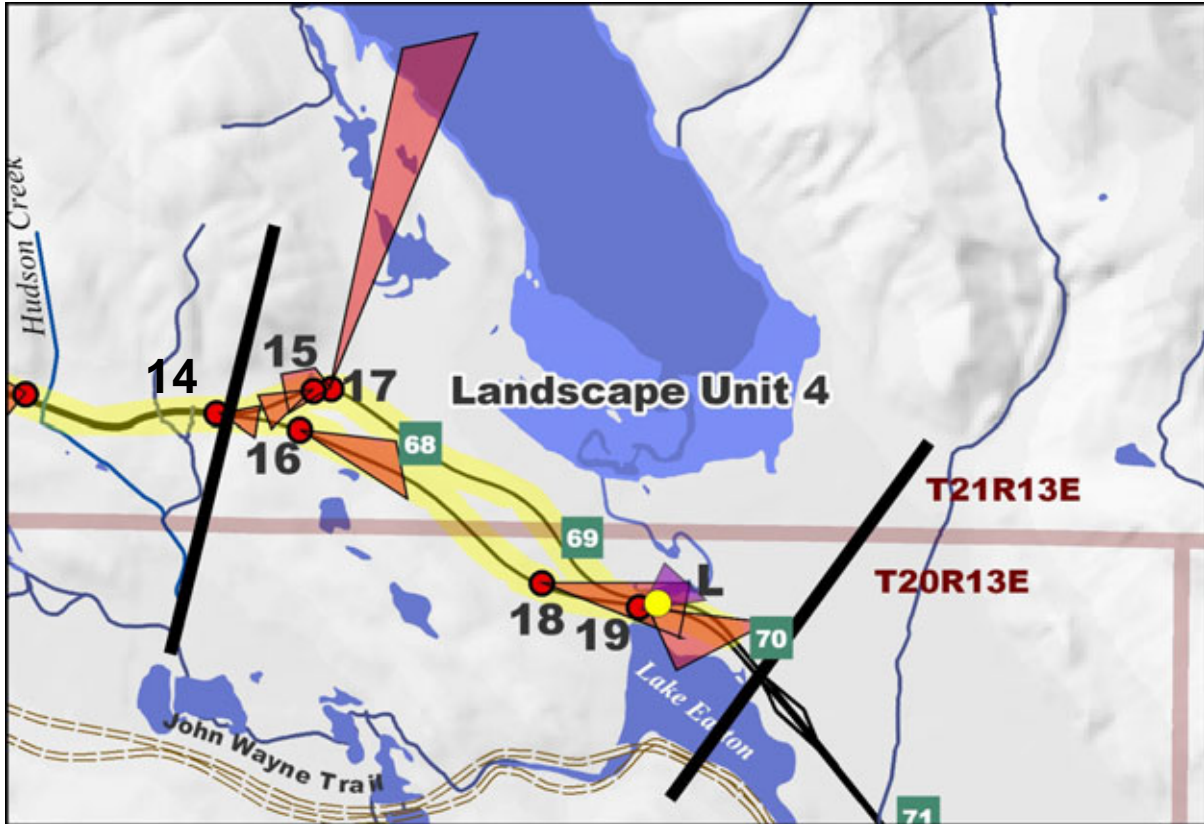


Figure 77 Landscape Unit 4 – Key Views

6.2.6.1. Key View 15 – MP 67.73 – Westbound



Figure 78 Key View 15 – MP 67.73 – Westbound

This westbound view looks toward the top of Easton Hill. I-90 is enclosed by forest with a wide, heavily forested median. Visual quality in this vicinity is moderately high. Views in the foreground are of the highway. Views in the middleground are of forest, and background views are of forested mountains.

6.2.6.2. Key View 16 – MP 67.7 – Eastbound

This view illustrates the typical eastbound view in this northern end of Landscape Unit 4. The foreground view is of the road, nearby Douglas fir and cottonwood trees, and the native grasses in the median. Middleground views are of the same mix of trees. The background view is also of trees, with mountain views straight ahead up the centerline of the road. The character of this portion of the roadside can be seen in Figure 79.



Figure 79 Key View 16 – MP 67.7 – Eastbound

The densely vegetated median, the rolling landform, the second-growth trees, and the distant mountain views combine to give this view an average vividness rating. There is little visible development other than the highway. The intactness rating for this scene is high. It also has a high unity rating since the forest seems almost unbroken when seen from a traveling vehicle, and travelers in the westbound lanes are not visible.

6.2.6.3. Key View 17 – MP 67.8 – Westbound

The foreground view, in Key View 17, is of roadside vegetation. The middleground view is of the mountain straight ahead. The background view, just right of center, is of mountains in the Alpine Lakes Wilderness.



Figure 80 Key View 17 – MP 67.8 – Westbound

Key View 17 has a moderately high vividness rating. The contrast between the forest and distant mountain views is very memorable. The highway and the power lines, which can occasionally be seen on the north and straight ahead, are the only signs of development. It has a high intactness rating. The overall unity rating for this scene is high. The total visual quality rating is high. At MP 67.8, there is an excellent, but quick, view up the Kachess Lake Valley to the Alpine Lakes Wilderness. This view, seen in Figure 81, is for information and has not been rated, due to the minimal duration of the view by motorists. This spectacular view is nearly blocked by second growth Douglas fir, Western Hemlock, black cottonwoods, and alders. As these trees mature, the view available will lessen even more.

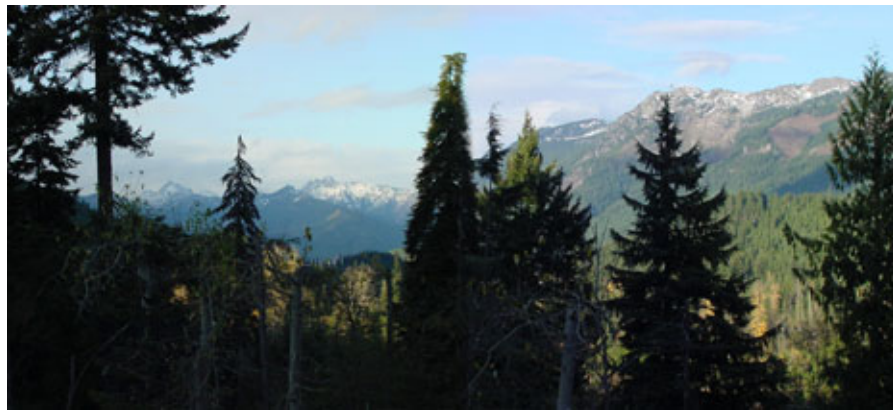


Figure 81 View Toward Alpine Lakes Wilderness from MP 67.8 – Westbound

6.2.6.4. Key View 18 – MP 69 – Eastbound

This view of the southeastern end of the project corridor and of Landscape Unit 4 opens from a forested corridor to a more open landscape. This view has Douglas fir seedlings in the foreground, more mature Douglas firs and cottonwoods in the middleground, and forest-covered mountains in the background. Guardrail divides the roadway from the roadside here instead of the Jersey barrier common in the previous Landscape Units. Figure 82 also shows the backside of traffic signs and their visibility.

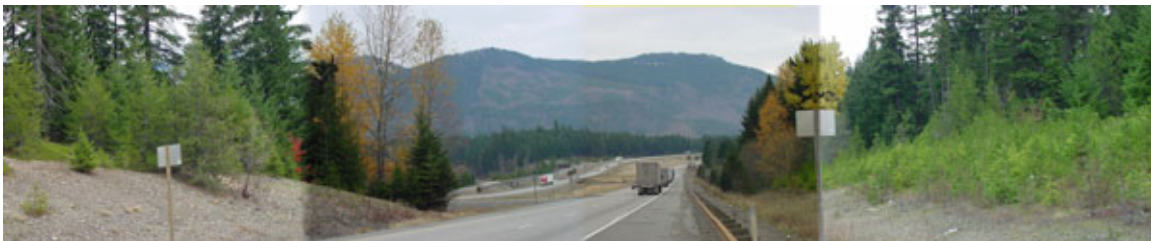


Figure 82 Key View 18 – MP 69 – Eastbound

This Key View has a vividness rating of just above average, again because of the lack of a water view. The road is the principle sign of development. It has a moderately high intactness rating. Its overall unity rating is moderately high.

6.2.6.5. Key View 19 –MP 69.5 – Eastbound – Kachess River CRA

This view is of an arm of the lakebed of Lake Easton between I-90 and the John Wayne Trail. In October 2001, when this photo was taken, it was dry, but commonly this area is covered in water. The foreground is of the guardrail, a struggling Douglas fir, and native grasses. Middleground views are of the lakebed and the Douglas fir forest at the Lake Easton State Park. Background views are of recently logged mountains, as seen in Figure 83.



Figure 83 Key View 19 – MP 69.5 – Eastbound – Kachess River CRA

When lake levels are high, this is a very memorable spot on the drive through the project corridor. There are often children fishing from the bridge. Lake Easton, with its forested shore and the distant, rounded mountains give this a moderately high-to-high vividness rating. Road and traffic signs, and the bridge over the Kachess River are signs of development, and cause some visual encroachment. Key View 19 has a moderately high intactness rating and a high unity rating.

6.2.6.6. Key View L – Toward I-90 from the Kachess River Bridge at Lake Easton State Park

Key View L was taken in 2004 from the Kachess River bridge located at the Lake Easton State Park. This is a popular bridge for fishing, and is located near camping and picnicking areas. Foreground views are of the old bridge railing and the Kachess River. The middleground view is occupied by I-90's bridge over the Kachess River. Background views are of mountains in the distance.



Figure 84 Key View L - Toward I-90 from the Kachess River Bridge at Lake Easton State Park

This scene has a water view, forested hills, and distant mountains. It has a moderately high-to-high vividness rating. The bridge in the middleground and the steep slopes are signs of development, as is the highway in the background. The intactness rating is moderately high. The road disrupts the unity of this view for a rating of average.

7. IMPACT ANALYSIS

Project impacts fall into two categories: those during construction; and permanent changes as a result of the project. Impacts from construction are temporary in nature, and include elements such as night construction lights, blasting, bridge scaffolding, pile driving, construction signs, detour roads, construction and silt fencing, and miscellaneous construction vehicles. During construction these activities will detract from existing visual quality. These impacts will not be analyzed for their visual impact because of their temporary nature. Vegetation removed as a result of construction impacts is analyzed and will be mitigated by revegetation.

The *Roadside Classification Plan*, a WSDOT policy document, requires that the roadside within the project corridor be restored to a forest plant community because of its “Forest” classification. Ratings for permanent project visual impacts assume design of roadway features according to the *Draft Architectural Guidelines* for this corridor and revegetation according to the *Roadside Classification Plan*. See Appendix A for the Ratings and Evaluations Sheet for numerical ratings for all views.

7.1. LANDSCAPE UNIT 1 – VIEWS FROM THE ROAD – MP 55.10 TO MP 60.75

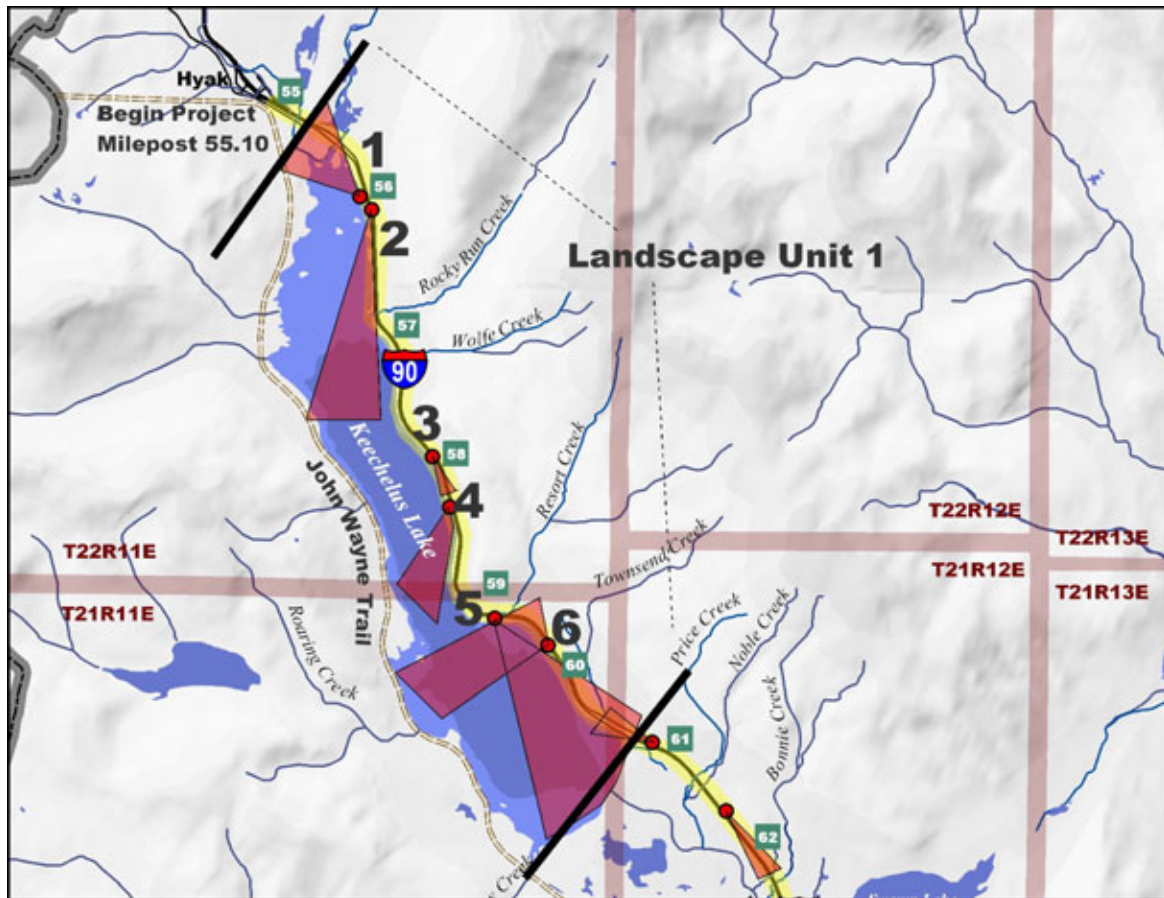


Figure 85 Landscape Unit 1 – Key Views From the Road

Landscape Unit is along the eastern shore of Keechelus Lake and includes four alternative alignments. Differences in the alignments exist only from MP 56.6, just east of Rocky Run Creek, to MP 59.9, at Resort Creek. Collectively, these variations in design are referred to as the Keechelus Lake Alignment Alternatives. The four Keechelus Lake Alignment Alternatives are:

- Alternative 1: Long Tunnels
- Alternative 2: Short Tunnels
- Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound
- Alternative 4: Both Directions of Traffic Along Keechelus Lake Around Slide Curve

Connectivity Restoration Areas (CRA's) at Gold Creek and Townsend Creek are not tied to the Keechelus Lake Alignment Alternatives, but are included within the Improvement Packages and CRAs as described in Section 4.1. At Gold Creek there are three connectivity restoration options proposed as part of the Improvement Packages. At Townsend Creek there is a single design option proposed.

7.1.1. Key View 1 – MP 56 – Westbound – Gold Creek CRA

The chain-off areas would be lengthened along this portion of roadway with increased lighting provided. Options for Gold Creek CRA provide new and various sized structures ranging from 300 feet to 1200 feet in length. These will be visible from this location. Because the roadside will be moved toward the lake and the roadside will be planted, vividness scores for vegetation and water are expected to rise above current levels. Total Visual Quality Ratings for this Key View are found in Table 3.



Figure 86 Key View 1

Key View 1 –MP 56 – Westbound – Gold Creek CRA – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.92
Improvement Package A	5.67
Improvement Package B	5.46
Improvement Package C	5.25

Table 3 View 1 – MP 56 – Westbound – Gold Creek CRA – Total Visual Quality Ratings

After project completion, visual quality ratings will highest for option A because of the removal of fill and the expanded opportunity for increased revegetation. As the opportunity for stream meander and replanting lessens, vividness ratings decrease. With revegetation all options are expected to have higher visual quality ratings that the existing condition.

7.1.2. Key View 2 – MP 56 – Eastbound – Rocky Run CRA

The chain-off areas would be lengthened in the alternatives for this portion of roadway. There would be increased lighting, and, as in Key View 1, the horizontal alignment shifts toward the lakebed. There could be potential distant views of new bridges. Revegetation after roadway construction will improve scores for vegetation, making an overall improvement in visual quality.



Figure 87 Key View 2

Key View 2 –MP 56 – Eastbound – Rocky Run Creek CRA – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.25
Single Ecological Connectivity option	5.50

Table 4 View 2 – MP 56 – Eastbound – Rocky Run Creek CRA – Total Visual Quality Ratings

7.1.3. Key View 3 – MP 57.5 – Eastbound – Keechelus Lake Alternative Alignments

This Key View is taken from the location where there are significant differences in the alignment of I-90 under the different Keechelus Lake Alignment Alternatives. At the present time, the snowshed is in view over the westbound lanes. The alternatives and their impacts are described as follows:



Figure 88 Key View 3

7.1.3.1. Alternative 1 - Long Tunnel

Twin bridges approximately 120 feet long are proposed at Rocky Run Creek, allowing for riparian revegetation. From this Key View, traveler will be inside the tunnel. Views of the mountains, the lake, and vegetation will be non-existent while in the tunnel. Because of this, visual quality at this location would be moderately low. The portion of the roadway along Keechelus Lake rendered obsolete by the tunnel would be removed and revegetated.

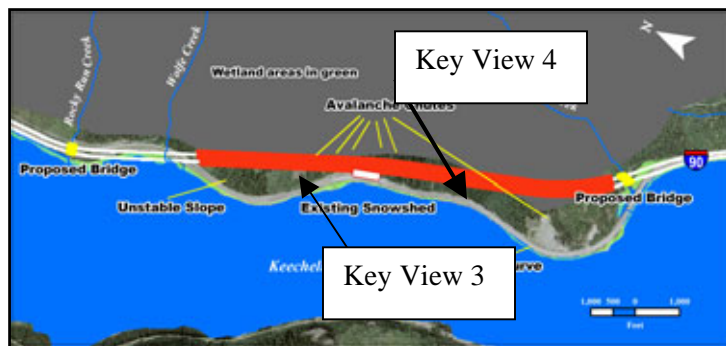


Figure 89 Alternative 1: Long Tunnels

7.1.3.2. Alternative 2 - Short Tunnel

Under Alternative 2, Key View 3 will still have views of the lake. The snowshed would be removed and a new bridge constructed to allow avalanches to pass below the bridge. This bridge will improve sight distance and bring the traveler closer to the lake. There would be an increase in views of the water, which will increase visual quality ratings at this location. There would be retaining walls between the lake and the eastbound lanes. Westbound lanes would be raised above the eastbound lanes and supported by retaining walls. Because of their high visibility, walls will be designed using the Architectural Guidelines. Message reader boards and traffic lights would be installed in front of the tunnel entrance to warn travelers of problems ahead. The existing roadway around Slide Curve would be removed and vegetation restored.

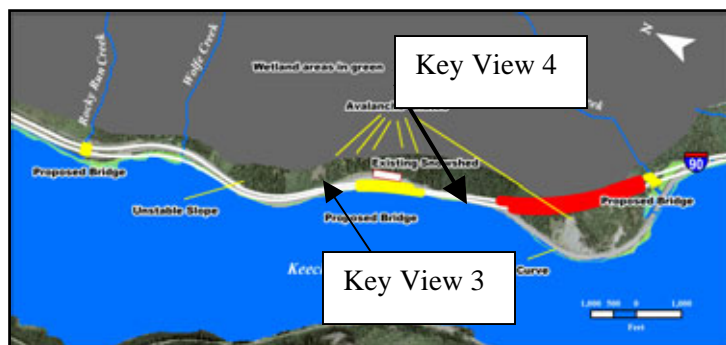


Figure 90 Alternative 2: Short Tunnels

Closer views of the lake, increased vegetation, and the use of the Architectural Guidelines on tunnel portals will result in higher vividness ratings than existing conditions.

7.1.3.3. Alternative 3 – Short Tunnel Westbound, No Tunnel Eastbound

This alternative would construct a westbound 3-lane, 0.6-mile-long tunnel through Slide Curve, and construct the eastbound lanes along the shoreline of Keechelus Lake around Slide Curve. West of the existing snowshed, the road will cut into the hillside to straighten out the “S” curve between Rocky Run Creek and the snowshed. The snowshed would be removed and a new bridge constructed to allow avalanches to pass below the bridge. There would be retaining walls between the lake and the eastbound lanes. Westbound lanes would be raised above the eastbound lanes and supported by retaining walls. Walls will be designed using the Architectural Guidelines because of their high visibility. Avalanche fencing, slope netting, and rock bolting would be installed on the slopes above Slide Curve. This can also allow vegetation to establish as the slope becomes more stable.

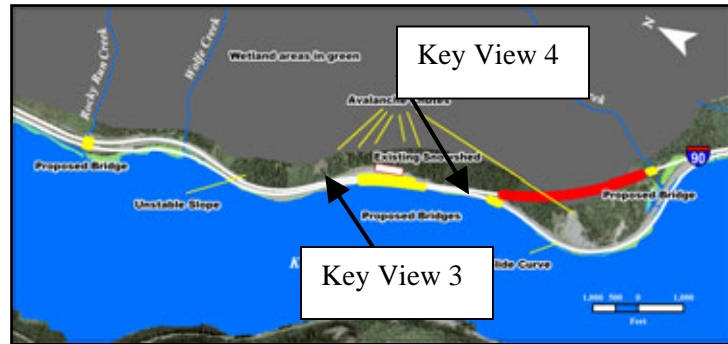


Figure 91 Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound

Visual Impacts from this alternative are greater than for the Short Tunnel and Long Tunnel Alternatives because the roadbed around Slide Curve will remain. However impacts are less than Alternative 4 because the footprint of the eastbound lanes would be less than the proposed six lanes of traffic around Slide Curve in Alternative 4. There would be visual benefits from retaining views of the lake around Slide Curve.

7.1.3.4. Alternative 4 – No Tunnels, Both Directions of Traffic Along Keechelus Lake

The fourth Keechelus Lake Alignment Alternative would construct three lanes in both the westbound and eastbound directions around Slide Curve. This design would straighten the substandard curves from just east of Rocky Run Creek to the snowshed, but would not remove the substandard curves at Slide Curve. Consequently, both westbound and eastbound lanes would meet 60 mph design standards. The snowshed would be removed and a new bridge constructed to allow avalanches to pass below the bridge. There would be retaining walls between the lake and the eastbound lanes. Westbound lanes would be raised above the eastbound lanes and supported by retaining walls. Walls will be designed using the Architectural Guidelines because of their high visibility. Avalanche fencing, slope netting, and

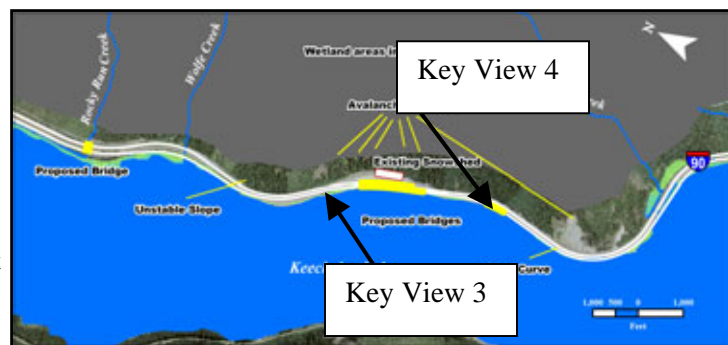


Figure 92 Alternative 4: No Tunnels, Both Directions of Traffic Along Keechelus Lake

rock bolting would be installed on the slopes above Slide Curve to protect both westbound and eastbound lanes from avalanches. This can also allow vegetation to establish as the slope becomes more stable.

This alternative would have good views of the lake, but would have less area available for planting than the other three alternative alignments.

Key View 3 – MP 57.5 – Eastbound – Keechelus Lake Alternative Alignments – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.67
Alternative 1: Long Tunnel	2.58
Alternative 2: Short Tunnel	5.25
Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound	5.17
Alternative 4: No Tunnel, Both Directions of Traffic Along Keechelus Lake	5.08

Table 5 View 3 – MP 57.5 – Eastbound – Keechelus Lake Alignment Alternatives – Total Visual Quality Ratings

Existing visual quality ratings for this Key View are moderately high. All alternatives would have increased levels of development due to the retaining walls and structures associated with the tunnels. Alternative 1 has the lowest ratings because of the loss of views while in the tunnel. The other alternatives improve visual quality because of the opportunity to see the lake, and because there will be vegetation planted where possible.

7.1.4. Key View 4 –MP 58.5 – Eastbound – Keechelus Lake Alternative Alignments

Key View 4 will be within the long tunnel, should Alternative 1 be selected. Alternative 1 will have lower visual quality ratings from the road, than other alternatives, because of the loss of views of the lake and forest-covered mountains. The entrance to the Short Tunnel Alternative would be directly ahead in this view. The alignments and discussion described within Key View 3 apply to this Key View. The Resort Creek improvements are part of the Keechelus Lake Alignment Alternatives, but are out view at this point.



Figure 93 Key View 4

Key View 4 – MP 58.5 – Eastbound – Keechelus Lake Alternative Alignments – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.67
Alternative 1: Long Tunnel	2.58
Alternative 2: Short Tunnel	5.25
Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound	5.17
Alternative 4: No Tunnel, Both Directions of Traffic Along Keechelus Lake	5.08

Table 6 View 4 – MP 58.5 – Eastbound – Keechelus Lake Alignment Alternatives – Total Visual Quality Ratings

With the Long Tunnel Alternative, viewers would be within a tunnel at this point, thereby decreasing the vividness ratings and decreasing scores for development. All other alternatives increase the level of development at this location because of views of tunnel portals in Alternatives 2 and 3, and the increased width of the roadbed and rock bolting and fencing in Alternative 4. However, visual quality ratings remain high, just below the Existing condition, with the exception of Alternative 1.

7.1.5. Key View 5 – MP 59.35 – Eastbound – Resort Creek CRA

Key View 5 looks southward along Keechelus Lake. The tunnel entrance and exit are behind the viewer. This Key View shows the Resort Creek CRA and the Keechelus Lake shoreline. Any changes to the roadway due to connectivity alterations will show in this Key View. The Resort Creek improvements are part of the Keechelus Lake Alignment Alternatives.



Figure 94 Key View 5

7.1.5.1. Alternative 1 - Long Tunnel and Alternative 2 Short Tunnel

These alternatives include constructing twin single-span bridges (approximately 120-feet long) over Resort Creek that will provide for fish passage at all reservoir pool-levels. Because the curve of the road will make the conveyance structures highly visible from eastbound lanes, bridge design at this location will be important. Twin bridges designed according to the Architectural Guidelines will provide rhythm and symmetry, and corridor continuity. In addition larger bridges can allow vegetation to grow in their entrances, which will soften their appearance. The abandoned portion of existing I-90 will be removed and planted with a native plant community.

7.1.5.2. Alternative 3 - Short Tunnel Westbound, No Tunnel Eastbound

The existing 6-foot corrugated metal culverts at Resort Creek would be replaced by a single-span bridge (120-feet long x 10-feet high) in the westbound lanes, and a series of large-span (10-foot to 30-foot span) bottomless culverts in the eastbound lanes that will provide for fish passage at all reservoir pool-levels. Architectural Guidelines will be used on the face of the culverts, so culverts

seen from this viewpoint will carry a consistent theme, together with bridge and wall detailing, along the corridor. The difference in treatments breaks the visual rhythm when seen from this location. The abandoned portion of existing I-90 will be removed and planted with a native plant community.

7.1.5.3. Alternative 4 – No Tunnels, Both Directions of Traffic Along Keechelus Lake Around Slide Curve

The existing 6-foot corrugated metal culverts at Resort Creek would be replaced by a series of large-span (10-foot to 30-foot span) bottomless culverts across both the westbound and eastbound lanes. Architectural Guidelines will be used on the face of the culverts, so culverts seen from this viewpoint will carry a consistent theme along the corridor. Treating both directions of traffic the same provides visual symmetry and rhythm.

Key View 5 – MP 59.35 – Eastbound – Resort Creek CRA, Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.58
Alternative 1: Long Tunnel Alternative	5.83
Alternative 2: Short Tunnel Alternative	5.83
Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound	5.17
Alternative 4: No Tunnels, Both Directions of Traffic Along Keechelus Lake	5.58

Table 7 Key View 5 – MP 59.35. –Eastbound – Resort Creek CRA – Total Visual Quality Ratings

Total visual quality ratings for this Key View are currently high and will remain so after project construction. Vegetation restoration along the shoreline will enhance vegetation ratings in Alternatives 1, 2, and 3. The peaks in the distance and the water will still be visible in all alternatives. Alternatives 1 and 2 with two long span bridges have visual quality ratings higher than the existing condition. All have high visual quality at this location.

7.1.6. Key View 6 – MP 59.85 – Westbound – Resort Creek CRA

All tunnel alternatives have the tunnel entrance/exit at this location. The sinuosity of the existing road alignment provides visual interest. This will change depending upon the Keechelus Lake Alignment Alternative chosen. The existing 6-foot corrugated metal culverts at Resort Creek would be replaced by a single-span bridge (120-feet long x 10-feet high) in the westbound lanes, and a series of large-span (10-foot to 30-foot span) bottomless culverts in the eastbound lanes that will provide for fish passage at all reservoir pool-levels. Architectural Guidelines will be used on the face of the culverts, so culverts seen from this viewpoint will carry a consistent theme, together with bridge and wall detailing, along the corridor.



Figure 95 Key View 6

7.1.6.1. Alternative 1 – Long Tunnel

From this view, the tunnel entrances and their infrastructure would be visible. The existing I-90 roadbed would be revegetated with a native plant community. This alternative rates equal to the existing condition because increased development at the tunnel portals is offset by the increase in vegetation on the reclaimed roadbed and around the bridges.

7.1.6.2. Alternative 2 – Short Tunnel

This alternative has the same characteristics as Alternative 1. The tunnel entrances and their infrastructure would be visible from this location. The existing I-90 roadbed would be revegetated with a native plant community. This alternative rates equal to the existing condition and Alternative 1 because increased development at the tunnel portals is offset by the increase in vegetation on the reclaimed roadbed and around the bridges.

7.1.6.3. Alternative 3 – Short Tunnel Westbound, No Tunnel Eastbound

This view retains the existing roadway, with a reduced footprint and adds one tunnel portal into the view. Resort Creek would flow under the westbound lanes through a single-span bridge and under the eastbound lanes through a series of 4 bottomless culverts. The Architectural Guidelines should be used on culvert headwalls and the bridge design since both will be visible from the opposing direction of travel. There will be opportunity to revegetated to a greater degree under and around the bridge than under and the culverts. Because the treatments are different, they will lack the visual harmony of two bridges, as in Alternatives 1 and 2. However, because the appearance of development will be slightly lower for this alternative, it rates the highest of the four alternatives at this location.

7.1.6.4. Alternative 4 – No Tunnels, Both Directions of Traffic Along Keechelus Lake Around Slide Curve

The existing 6-foot corrugated metal culverts at Resort Creek would be replaced by a series of large-span (10-foot to 30-foot span) bottomless culverts across both the westbound and eastbound lanes. . The Architectural Guidelines will be used on the face of the culverts, so any culvert option will carry the consistent corridor theme. Having the same conveyance structures for both directions of traffic provides visual symmetry.

At Key View 6, Alternative 3 has visual quality ratings slightly higher than existing conditions and the other alternatives. All ratings are high at this location because of views of the lake, mountains, and the forest.

Key View 6 –MP 59.85 – Westbound – Resort Creek CRA, Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.08
Alternative 1: Long Tunnel	5.08
Alternative 2: Short Tunnel	5.08
Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound	5.13
Alternative 4: No Tunnels, Both Directions of Traffic Along Keechelus Lake	5.08

Table 8 View 6 – MP 59.85 – Westbound – Resort Creek CRA – Total Visual Quality Ratings

7.1.6.5. Landscape Unit 1 – Summary of Ratings – Views From the Road

The chart in Figure 96 compares the averages of all ratings for the Keechelus Lake Alignment Alternatives. Ratings from Key Views 3, 4, 5, and 6 were used to determine total visual quality averages for each alignment alternative. Within Landscape Unit 1 for views From the road, Alternative 2 has the highest visual quality ratings, followed by the Existing Condition and Alternative 4.

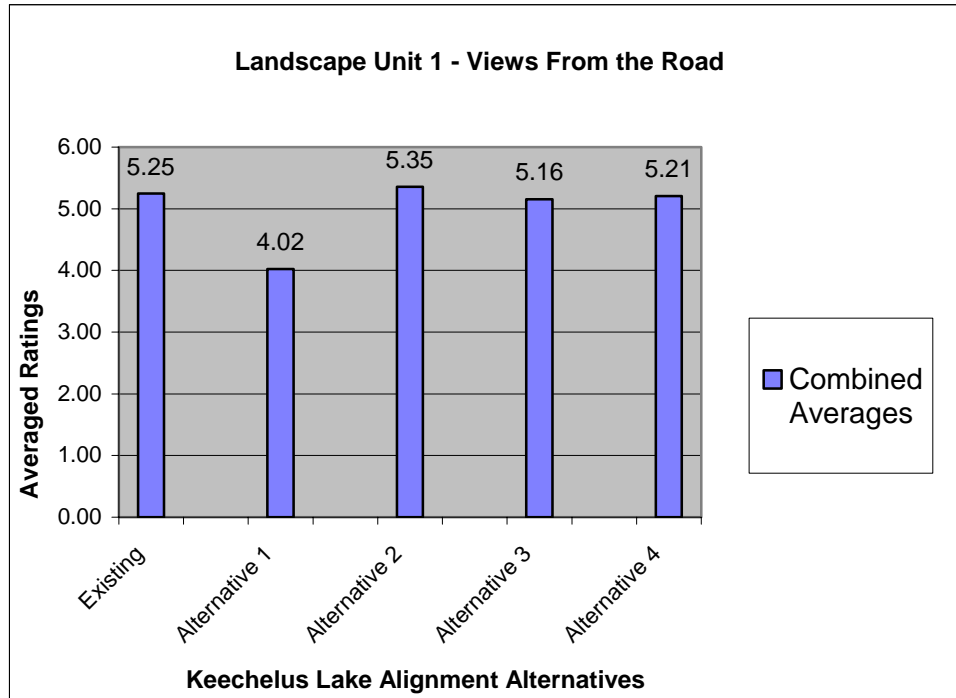


Figure 96 Landscape Unit 1 – Comparison of Keechelus Lake Alignment Alternatives – Views from the Road

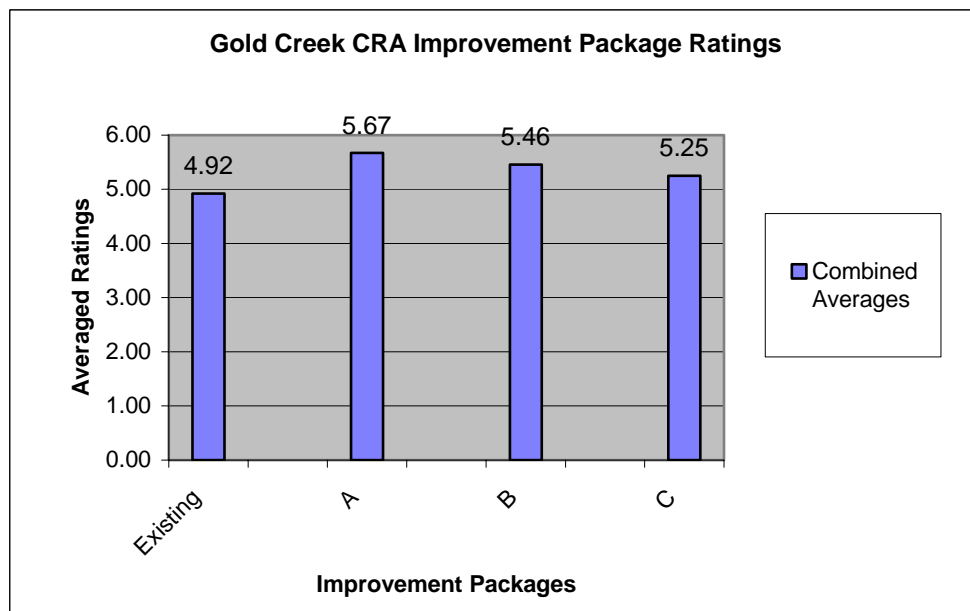


Figure 97 Landscape Unit 1 – Comparison of Improvement Packages – Views from the Road

At Gold Creek, Improvement Package A has the highest visual quality rating because the longer bridges and the removal of roadway fill will allow an increased area for revegetation. The use of the Architectural Guidelines in the design of the bridges and retaining walls will provide for corridor continuity and will make them more memorable.

7.2. LANDSCAPE UNIT 1 – KEY VIEWS TOWARD THE ROAD – MP 55.10 TO MP 60.75

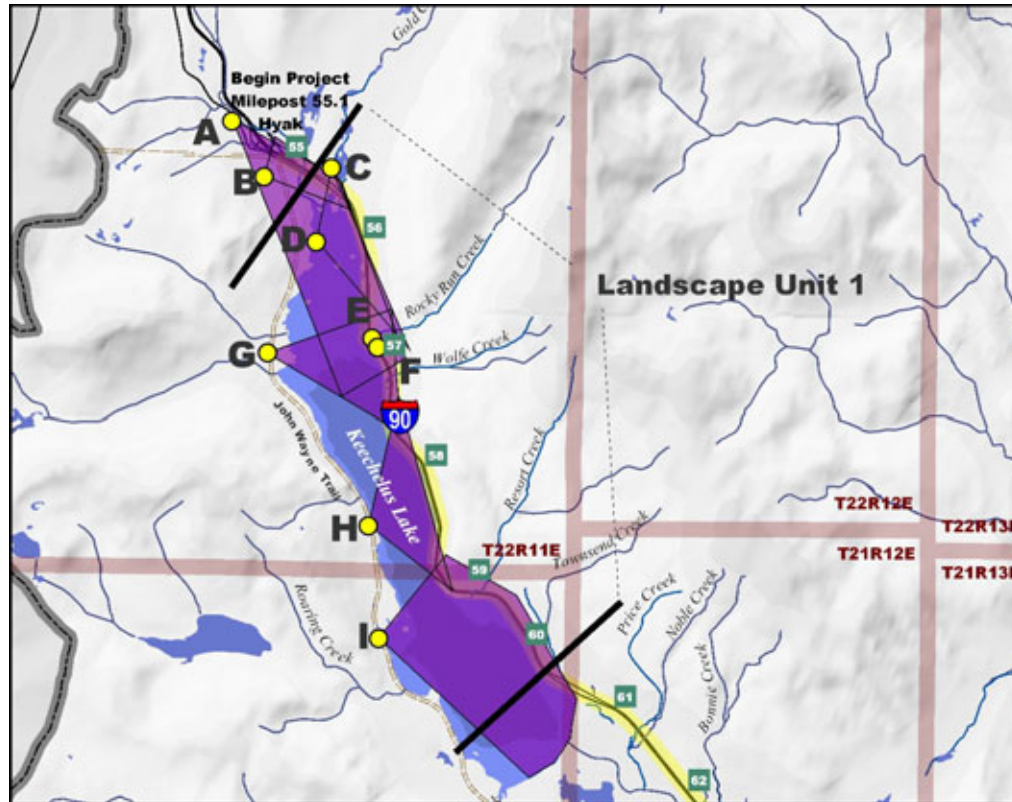


Figure 98 Landscape Unit 1 – Key Views Toward the Road

Views toward the road are seen in Figure 98 for reference in the discussion of visual ratings of the views toward the road. Key Views were selected to represent views from which there would either be large user groups, for example from the ski area, or views of long duration. Examples of long duration would be from people using the John Wayne trail, or residents and visitors to the Rocky Run Creek campsites or summer homes.

7.2.1. Key View A – I-90 from Ski Slopes

The ski slopes have a distant view of the Hyak area and the beginning of the project. The highway is in the background of this view. All alternatives propose increasing vegetation from the current state to blend the highway with its surroundings. The Gold Creek Improvement Package A will allow the greatest opportunity for vegetation, so it has the highest visual quality rating. All options increase visual quality from the

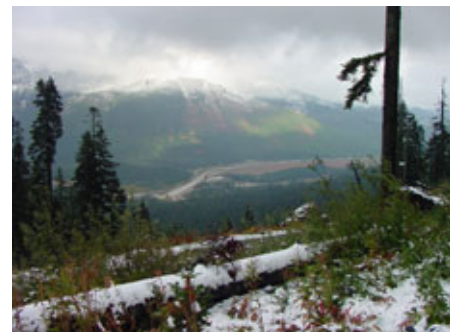


Figure 99 Key View A

existing condition. Table 9 compares the averages of visual quality ratings from Key View A.

Key View A – Gold Creek CRA From Ski Slopes – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.33
Improvement Package A	5.83
Improvement Package B	5.79
Improvement Package C	5.79

Table 9 Key View A – Gold Creek CRA from Ski Slopes – Total Visual Quality Ratings

7.2.2. Key View B – Gold Creek CRA from Hyak Residences

From this viewpoint, the highway is in the middleground and is seen as a thin line. The landform rating is very high and would remain so after project completion. Development at Hyak is the principle encroachment in this view and would not change with any I-90 alternative.



Figure 100 Key View B

Key View B –Gold Creek CRA From Hyak Residences – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.50
Improvement Package A	4.50
Improvement Package B	4.50
Improvement Package C	4.50

Table 10 Key View B – Gold Creek CRA from Hyak Residences – Total Visual Quality Ratings

Vegetation outside the right-of-way partially shields the view of the highway. All visual quality ratings are expected to remain the equal to the existing condition after project completion from this viewpoint.

7.2.3. Key View C – MP 55.5 – Gold Creek CRA and Sno-park

From this viewpoint on FS road 4832, the twin bridges over Gold Creek are in the middleground. Improvement Package A proposes twin single-span bridges approximately 120 feet long west of this location. Improvement Package A also proposes two parallel multi-span bridges across the channel migration zone, which replaces the bridges in Key View C. These bridges would be approximately 900 feet long in the westbound direction and 1100 feet long in the eastbound direction. The removal of roadway fill and the opportunity for riparian and wetland vegetation to establish under the bridge and on either side of the bridges would increase visual quality



Figure 101 Key View C

ratings for vegetation and water. The use of the Architectural Guidelines at this location is especially important because of its high visibility from FS Road 4832.

Improvement Package B proposes longer, multi-span bridges across Gold Creek's channel migration zone (approximately 1,000 feet long westbound and 1,200 feet long eastbound). No new bridges are proposed west of this view. The removal of roadway fill will allow vegetation to establish under and around the bridge. This would increase ratings for water and vegetation. As in option A, the use of the Architectural Guidelines at this location is especially important because of its high visibility from FS Road 4832.

Improvement Package C proposes twin single-span bridges west of Key View C and twin 300-foot long, multi-span bridges within this view. This option will remove less roadway fill and will allow less revegetation of the riparian corridor than either A or B. However, it will provide more restoration opportunity than exists at the present time.

Key View C –MP 55.5 – Gold Creek CRA and Sno-park – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.50
Improvement Package A	6.00
Improvement Package B	6.00
Improvement Package C	5.83

Table 11 Key View C – MP 55.5 – Gold Creek CRA – Total Visual Quality Ratings

All options have higher visual quality ratings than at the present time because of the increased opportunity for the establishment of vegetation and the increased opportunity for views of water with longer bridges and their associated plantings.

7.2.4. Key View D – Boat Ramp



Figure 102 Key View D

The view of I-90 from this Key View is of a horizontal line through the middleground. Retaining walls are proposed, where necessary, along the lake, to support I-90. These will be designed using the Architectural Guidelines. From this location, I-90 will remain in the middleground. Vividness, intactness, and unity ratings are slightly higher than existing conditions after construction of any of the alignment alternatives because of proposed increase in vegetation between the highway and the lake and because the long expanse of bare shoreline will be replaced by a retaining wall.

Key View D – Boat Ramp – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.83
Long Tunnels	6.00
Short Tunnels	6.00
Short Tunnel Westbound, No Tunnel Eastbound	6.00
No Tunnels, Both Directions of Traffic Along Keechelus Lake	5.83

Table 12 Key View D – Boat Ramp – Total Visual Quality Ratings

Ratings for the tunnel alternatives go up because all or part of the existing roadbed around Slide Curve will be removed and planted with native vegetation under those alternatives.

7.2.5. Key View E – MP 56.9 – Rocky Run Campground

From the campsites closest to FS Road 4832, there are some views of the highway in the middleground. There is a berm between the Forest Service road and I-90 that screens direct views from some of the campsites. Oblique views are of mature trees and native vegetation in the foreground, which partially screen the highway, and the Forest Service road in the middleground, and Keechelus Lake and the mountains in the background. The Build Alternative proposed raises the highway profile approximately 10 feet over Rocky Run Creek then returns to the existing grade, and allows for a chain-on area in this location. The heaviest use of the chain-on area will be in the winter when the campground is closed. There may be greater visibility of the highway from the campground. This possibility lowers scores for development. Where possible, screening vegetation will be planted between I-90 and Forest Service Road 4832.



Figure 103 Key View E

Key View E –MP 56.9 – Rocky Run Campground – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.08
Build Alternatives	5.00

Table 13 Key View E –MP 56.9– Rocky Run Campground – Total Visual Quality Ratings

The views from this location have high ratings because of foreground views of large trees and native shrubs and background views of Keechelus Lake and mountains. FS Road 4832 is more intrusive than I-90 in the middleground view. The project proposes to increase evergreen plantings on the roadside to screen views of the highway from this location. Because of this, ratings are expected to fall slightly below the existing condition, but will remain high.

7.2.6. Key View F – MP 57.25 – Rocky Run Summer Homes

From the homes closest to FS Road 4832, there are currently views of the highway and the Forest Service road in the middleground. The right-of-way between the Forest Service road and I-90 is very narrow at this location. There are some cottonwoods and Douglas firs on the roadway shoulder, protected by an unobtrusive cable barrier. Views from the homes are of mature trees and native vegetation in the foreground, the highway and Forest Service road in the middleground, and Keechelus Lake and the mountains in the background.



Figure 104 Key View F

Key View F – MP 57.25 – Rocky Run Summer Homes - Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.83
Build Alternatives	4.75

Table 14 Key View F – MP 57.25 – Rocky Run Summer Homes – Total Visual Quality Ratings

The views from this location are rated moderately high because of the foreground and background views. Both FS Road 4832 and I-90 are seen in the middleground view. While the pavement width will increase, the elements that make these views attractive (the large trees, Keechelus Lake, and the mountains) will still remain the same. The project can increase evergreen plantings opposite the entrance road to these summer homes in an effort to screen the highway from the viewers. Because of this screening visual quality ratings are expected to be just below the existing condition, but remain moderately high.

7.2.7. Key View G – John Wayne Trail at Cold Creek

As in all the views from the John Wayne Trail, the viewer sees I-90 as a thin, pale band with trucks and cars moving along its length in the middleground. Existing total visual quality ratings are high from the trail along the western shore of Keechelus Lake. Keechelus Lake Alignment Alternatives add retaining walls for I-90 but increase vegetation along the lakeshore, especially around Gold Creek. Existing total visual quality ratings are high from the trail along the western shore of Keechelus Lake. They will remain high after project completion.



Figure 105 Key View G

Key View G – John Wayne Trail at Cold Creek – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.92
Long Tunnels	6.08
Short Tunnels	6.08
Short Tunnel Westbound, No Tunnel Eastbound	5.92
No Tunnels, Both Directions of Traffic Along Keechelus Lake	5.92

Table 15 Key View G – John Wayne Trail at Cold Creek – Total Visual Quality Ratings

7.2.8. Key View H – John Wayne Trail Across from the I-90 Snowshed

Any changes, such as tunnel entrances or roadside restoration, will affect this view more than the other Key Views along John Wayne Trail, because this is one of the narrower areas of the lake. The snowshed will be removed in Alternatives 2, 3, and 4. The proposed bridge in front of the snowshed location will be visible from Key View H. The use of the



Figure 106 Key View H – Across from Snowshed

Architectural Guidelines for this bridge will be important to visual quality from this view. The snowshed may, or may not remain in this alternative. Because of the Keechelus Lake snowshed's status as an historic feature, coordination with the State Historic Preservation Officer (SHPO) will be required to determine its future.

From this view, Alternatives 1 and 2 will put I-90 in the tunnels and out of view around Slide Curve. The existing roadbed will be restored to a native forest community. This combination results in very high visual quality when viewed from across the lake – the more roadbed removed, the higher the rating. Alternative 3 will provide opportunities for partial revegetation of the roadbed, and will require slope protection fencing above Slide Curve. A larger bench and slope protection fencing will be required for Alternative 4 so scores will be slightly below the existing condition from this viewpoint.

Key View H – John Wayne Trail Across From the I-90 Snowshed – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.42
Long Tunnels	6.08
Short Tunnels	6.04
Short Tunnel Westbound, No Tunnel Eastbound	5.96
No Tunnels, Both Directions of Traffic Along Keechelus Lake	5.33

Table 16 Key View H – John Wayne Trail Across from Snowshed – Total Visual Quality Ratings

Alternative 1 has the highest ratings because of the decrease in the road's footprint and the increase in screening of vegetation. Alternatives 2 and 3 will decrease the highway footprint around Slide Curve and allow revegetation; this will increase their scores for vegetation from the existing condition in relation to the amount of roadbed restored.

7.2.9. Key View I – John Wayne Trail View of Slide Curve

From this view, the eastern tunnel portals will be seen, along with the Resort Creek CRA options associated with each Keechelus Lake Alignment Alternative. Changes to the Resort Creek area can provide the opportunity for increased vegetation on the delta formed by the creek and under and around bridges. Any avalanche fencing or rockfall netting will not



Figure 107 Key View I

be visible from this distance, but significant new rock cuts may be visible.

The Long Tunnel and Short Tunnel Alternatives revegetate the existing roadbed and propose twin single-span bridges over Resort Creek. The tunnel entrances will have signals, message boards, and other associated infrastructure. From this distance they will not disrupt visual unity to a high degree. The revegetation of the existing roadbed around Slide Curve will offset any structures or lighting around the tunnel entrances.

The Short Tunnel Westbound, No Tunnel Eastbound Alternative proposes a series of large-span bottomless culverts under the eastbound lanes for fish passage. The westbound lanes would pass over Resort Creek on a single-span 120-foot bridge. However, the eastbound lanes will screen the westbound lanes from view from this location.

The No Tunnels, Both Directions of Traffic Along Keechelus Lake alternative proposes a series of large-span bottomless culverts on the Resort Creek channel meander zone. The culverts will be visible from across the lake. They should be designed using the Architectural Guidelines for this project.

Key View I – John Wayne Trail View of Slide Curve – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.83
Long Tunnels	5.88
Short Tunnels	5.88
Short Tunnel Westbound, No Tunnel Eastbound	5.88
No Tunnels, Both Directions of Traffic Along Keechelus Lake	5.79

Table 17 Key View I – John Wayne Trail View of Slide Curve – Total Visual Quality Ratings

All tunnel alternatives will have ratings higher than existing because of the opportunity to restore vegetation to all or part of the existing I-90 around Slide Curve. The opportunity to blend and screen the roadway from views from across the lake will offset any increase in development when seen from this distance.

7.2.10. Landscape Unit 1 – Summary of Ratings – Views Toward the Road

Figure 108 compares the averages of the visual quality ratings for each of the Keechelus Lake Alignment Alternatives. Ratings from Key Views F, G, H, and I were used to analyze views of the alignment alternatives. Alternatives 1 and 2 have virtually the same visual quality ratings from across the lake. The increase in vegetation offsets the increase in development when seen from a distance. Alternative 3 also proposes increasing vegetation between the roadway and the lake, but to a lesser degree than Alternatives 1 and 2. This is reflected in the ratings.

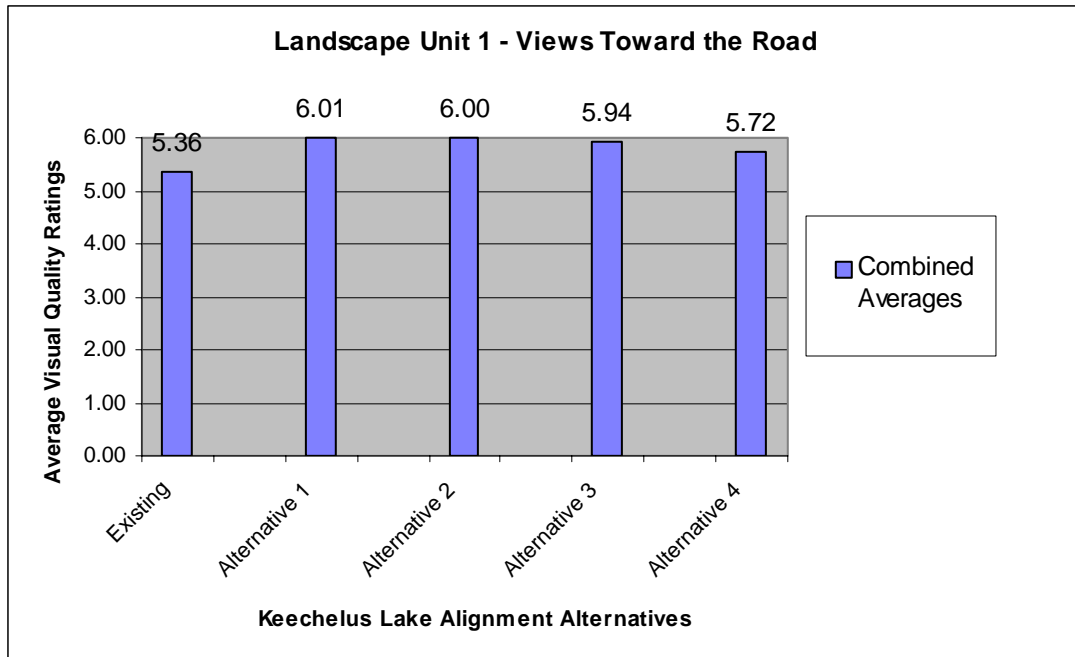


Figure 108 Landscape Unit 1 – Average of Visual Quality Ratings – Views Toward the Road

Key Views A, B, and C, with views toward Gold Creek, provided data to average for the Gold Creek CRA. Improvement Package A has visual quality ratings slightly higher than Improvement Package B or C. This is because the larger bridge spans allow greater opportunity for revegetation, which blends the structure with the surrounding forest. Comparative ratings can be seen in Figure 109. All alternatives in this Landscape Unit have high visual quality ratings, which will be improved by the proposed Build Alternatives.

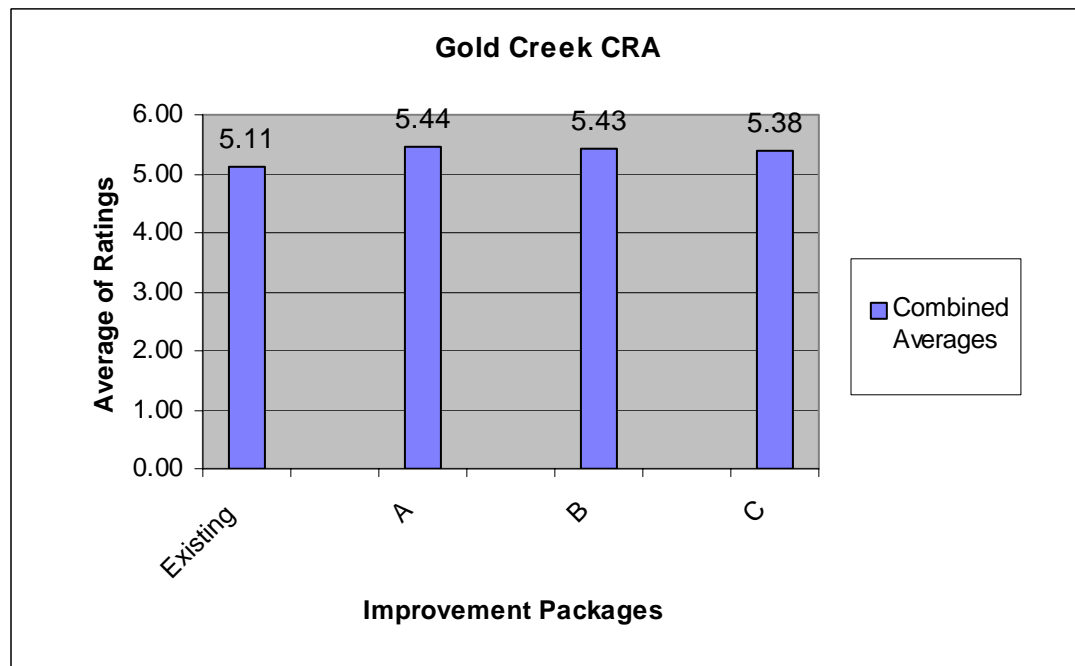


Figure 109 Landscape Unit 1 – Views Toward the Road – Gold Creek CRA

7.3. LANDSCAPE UNIT 2 – MP 60.75 TO MP 64.41

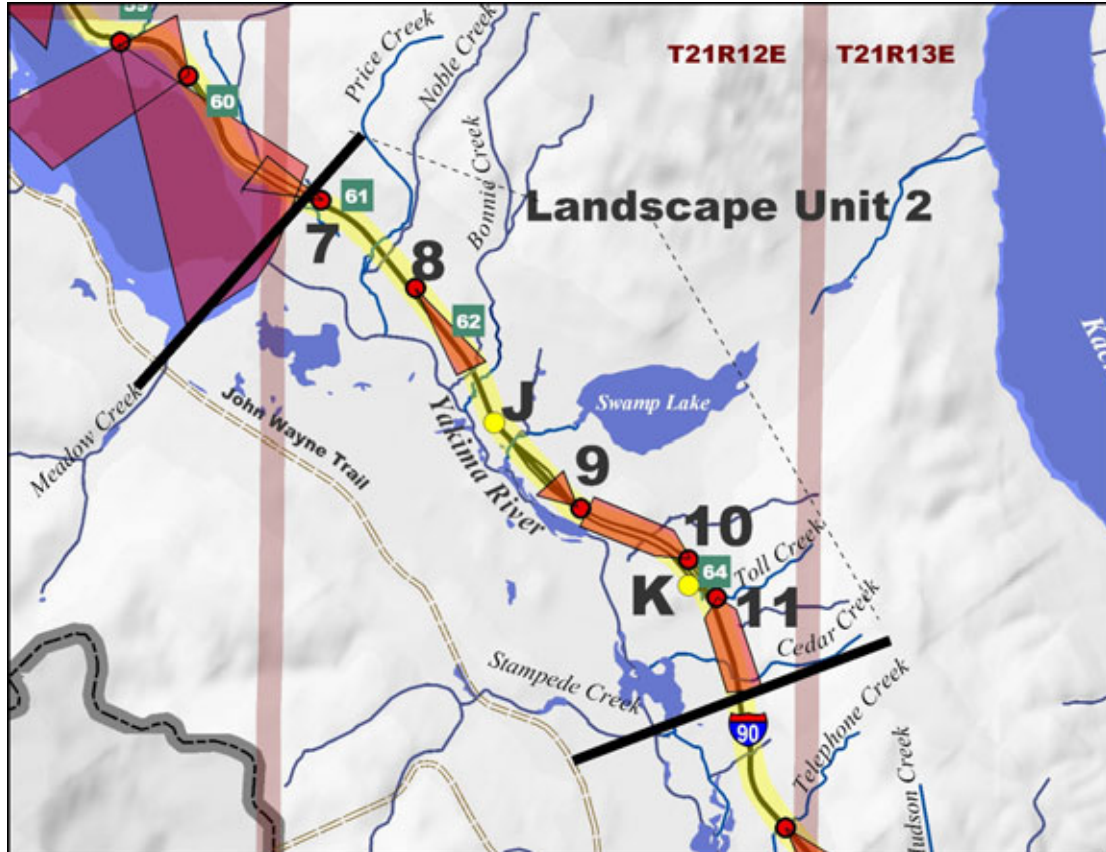


Figure 110 Landscape Unit 2 – Key Views

7.3.1. Key View 7 – MP 60.75 – Westbound

This alternative carries the road in its current horizontal alignment but widens the road to three lanes in each direction. This widening will necessitate removing vegetation and cutting into the rock on either side of the road. The rock island will remain in the median but will be slightly narrower. Slope flattening, slope protection fencing, or rock bolting will be used to minimize rock fall hazards. With revegetation, the vividness and unity ratings are equal to existing conditions.



Figure 111 Key View 7

Key View 7 – MP 60.75 – Westbound – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.67
Build Alternatives	4.67

Table 18 Key View 7 – MP 60.75 – Westbound – Total Visual Quality Ratings

7.3.2. Key View 8 – MP 61.75 – Eastbound – Price Creek CRA Vicinity

This location has a grassy median and a wide, grassy shoulder with a mixed-age forest beyond. Improvement Package A proposes twin single-span bridges in the vicinity of MP 60.9. At Price and Noble Creeks, twin multi-span bridges, approximately 800-feet long are proposed at mileposts 60.9, 61.4, and 61.7. Improvement Packages A and B propose closing the Sno-park and restroom facilities, including removing pavement and revegetating that area.



Figure 112 Key View 8

Improvement Package B has the same elements as Improvement Package A, but does not include the bridges to the east located at MP 61.7. With the use of the Architectural Guidelines on bridge rails, this alternative will have visual impacts equal to Improvement Package A.

Improvement Package C proposes a series of three, twin single-span bridges over the draw at MP 60.9, 61.4, and 61.7. This alternative proposes retaining the current Sno-park and restroom facilities. Because these facilities are retained, losing the opportunity for revegetation, this alternative has the lowest visual quality ratings of the three alternatives at this location.

Key View 8 – MP 61.75 – Eastbound – Price/Noble Creeks CRA Vicinity – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.58
Improvement Package A	5.42
Improvement Package B	5.42
Improvement Package C	4.63

Table 19 Key View 8 – MP 61.75 – Eastbound – Price/Noble Creeks CRA Vicinity – Total Visual Quality Ratings

Current visual quality ratings are moderately high. The lack of a water view constrains the rating number, but there are large Douglas firs on the roadside that enclose the highway, giving this portion a nice quality. Where possible, avoiding or minimizing disturbance to mature Douglas firs will retain the feeling of enclosure, and provide screening for the highway. Restoration of the forest plant community at the Price Creek facility will increase ratings for vegetation, development, and unity for Improvement Packages A and B. The use of the Architectural Guidelines on any bridge railings will provide corridor continuity. Therefore, ratings will improve after project construction for all options.

7.3.3. Key View 9 – MP 63.2 – Westbound – Swamp Creek CRA/Stampede Pass Interchange

Improvement Package A proposes to change the profile of I-90 so that it passes over the road to Stampede Pass. Twin multi-span bridges are proposed at the west end of the interchange. A twin single-span bridge is proposed at the east end of the interchange. Since the road will pass over these bridges and there is a slight curve to the roadway, it will be important to design the bridges and railings using the Architectural Guidelines. The change in the profile of the highway, removing the current bridge over I-90, significantly improves the visual quality at this Key View.



Figure 113 Key View 9

Improvement Package B proposes a bridge over I-90 at the Stampede Pass Interchange, which will be very visible, and twin single-span bridges at either end of the onramps and additional single-span bridges west of Swamp Creek. Because the bridge over I-90 is one of the more visible bridges, the use of the Architectural Guidelines will be critical at this location. The Architectural Guidelines should also be used for bridge rail design for all proposed bridges.

Improvement Package C proposes a bridge over I-90 for the Stampede Pass Interchange, which will be highly visible. Under this option, one bridge is proposed across Swamp Creek and a large bottomless culvert is proposed at the east end of the intersection for surface water. The difference between the bridge and culverts at this location will not be apparent since there are no views toward the roadway that can see both at the same time. Culverts have lower visual quality ratings than bridges because there is less opportunity for planting and less opportunity to use the Architectural Guidelines.

Key View 9 –MP 63.2 – Westbound – Swamp Creek CRA/Stampede Pass Interchange –Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.58
Improvement Package A	5.33
Improvement Package B	4.83
Improvement Package C	4.83

Table 20 Key View 9 – MP 63.2 – Westbound – Swamp Creek CRA/Stampede Pass Interchange – Total Visual Quality Ratings

Ratings for Improvement Packages B and C are above those of the existing condition because of the use of the Architectural Guidelines on the bridges and offsetting roadside restoration. Total visual quality would be moderate to moderately high for these two Improvement Packages. Improvement Package A will improve the visual quality of this vicinity most by putting the I-90 over the road to Stampede Pass, and taking it and its associated slopes out of the view from I-90.

7.3.4. Key View 10 – MP 63.9 – Westbound – Toll Creek CRA

Twin single-span bridges will allow an unnamed creek to flow under I-90. This location currently has mature Douglas firs growing in the median. These provide a dense visual screen between eastbound and westbound lanes of traffic, and make this a pleasant portion of roadway to travel through. The median width will be decreased slightly at this location. There are currently luminaires at the end of the on ramp in this view.



Figure 114 Key View 10

Improvement Packages A and B are the same for this CRA. They propose twin single-span bridges, approximately 120 feet long west of this view. There would also be twin bottomless culverts at Toll Creek. The use of the Architectural Guidelines on structures is critical to visual quality at this location.

Improvement Package C proposes twin bottomless culverts for the stream crossings. Bridges provide more opportunity for revegetation in their openings than culverts, so rate higher for vegetation than culverts. . The use of the Architectural Guidelines on the bridge railings and the bridge over I-90 are critical to visual quality at this location. Visual quality will be enhanced by the improvement in corridor continuity through the use of the Architectural Guidelines and by minimizing impacts to vegetation where possible.

Key View 10 – MP 63.9 – Westbound – Toll Creek CRA– Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.67
Improvement Package A	5.13
Improvement Package B	5.13
Improvement Package C	5.08

Table 21 Key View 10 – MP 63.9 – Westbound – Toll Creek CRA - Total Visual Quality Ratings

7.3.5. Key View 11 – MP 64.1 – Eastbound – Cabin Creek Road/Toll Creek CRA

This view is of the on and off ramps for Cabin Creek Road and the I-90 eastbound lanes. Improvement Packages A, B, & C all propose installing twin bottomless culverts just beyond the end of this onramp at Toll Creek. To avoid impacts to the Cabin Creek Sno-park, the road



Figure 115 Key View 11

will be moved slightly to the north. This will result in some cut slopes along the westbound off ramp. Because this will remove some trees, it will decrease the visual quality at those points. Planting shrubs and trees along the roadside can help minimize visual impacts. The use of the Architectural Guidelines on any railings will provide corridor continuity. Visual quality ratings after project completion are expected to be slightly lower than the existing condition.

Key View 11 – MP 64.1 – Eastbound – Cabin Creek Road/Toll Creek CRA– Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.67
Improvement Package A	4.58
Improvement Package B	4.58
Improvement Package C	4.58

Table 22 Key View 11 – MP 64.1 – Eastbound – Cabin Creek Road/Toll Creek CRA– Total Visual Quality Ratings

7.3.6. Key View J – MP 62.50 – Bonnie Creek CRA – Crystal Springs Campground

There are numerous deciduous shrubs between the campground and the highway that would screen the views during the summer and early fall months. The project raises the profile of the highway 20 to 25 feet, supported by retaining walls. The height of the walls depends on the Bonnie and Swamp Creeks CRA options chosen. Screening vegetation will be planted at the base of these walls to blend them into their surroundings. Because the higher profile will be to the northeast of this view there may be some shading impacts during the morning hours in the buffer between the highway and the forest. Improvement Package B proposes a single-span bridge to the right of Key View J. This will decrease ratings for development for Improvement Package B. Planting shade tolerant evergreen trees and shrubs along the project edges can increase the screening of the road from the campground. Shading issues are not anticipated to impact the campground itself. Increased use of evergreen species may help slightly to provide a psychological buffer for noise.



Figure 116 Key View J

Key View J – MP 62.50 – Bonnie Creek CRA – Crystal Springs Campground – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.25
Improvement Package A	5.08
Improvement Package B	5.00
Improvement Package C	5.08

Table 23 Key View J – MP 62.50 – Bonnie Creek CRA – Crystal Springs Campground – Total Visual Quality Ratings

Visual quality ratings are projected to be slightly lower than the existing condition because of increased development in the form of retaining walls and the bridge in Improvement Package B.

7.3.7. Key View K – MP 64.0 – Eastbound – Toll Creek CRA – Cabin Creek Sno-park

This Sno-park is on the southwest side of the on-ramp from Key View 11. Improvement Packages have been described for the Toll Creek CRA. The project will move the roadway away from the Sno-park. Retaining walls are proposed between I-90 and the Sno-park, which may provide an opportunity to plant shrubs along their base as a measure to minimize visual impacts. At present, the foreground view of a gravel parking lot and roadway shoulder has low vividness, intactness, and unity ratings. Although the road profile will be higher, the use of a retaining wall using the Architectural Guidelines will provide corridor continuity.



Figure 117 Key View K

Key View 11 – MP 64.1 – Eastbound – Toll Creek CRA – Cabin Creek Sno-park – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.67
Improvement Package A	4.71
Improvement Package B	4.71
Improvement Package C	4.71

Table 24 MP 64.1 – Eastbound – Toll Creek CRA – Cabin Creek Sno-park – Total Visual Quality Ratings

Visual quality will improve slightly after construction because of higher scores for manmade objects, in the form of the retaining wall design and planting vegetation on the roadsides. At present, visual quality at this location is high average. After construction, the visual quality will improve to moderately high. During winter, this parking area is covered with snow and cars. At that time visual quality is moderately high and will remain so.

7.3.8. Summary of Ratings for Landscape Unit 2

The chart in Figure 118 results from ratings for Key Views 8, 9, 10, 11, and J because they have views of elements addressing the needs at the Price/Noble, Bonnie, Swamp, and Toll Creeks CRA's Improvement Package A has slightly higher overall visual quality ratings because increased opportunity to plant shrubs under and around the bridge openings raises ratings for vividness. More revegetation can take place under and adjacent to a bridge than around a culvert. With the Architectural Guidelines, the bridges will be more memorable and will provide corridor continuity, which also raises ratings for manmade objects, encroachment, and unity. The opportunity to plant trees or shrubs along the base of the retaining wall at the Cabin Creek Sno-park also raises ratings.

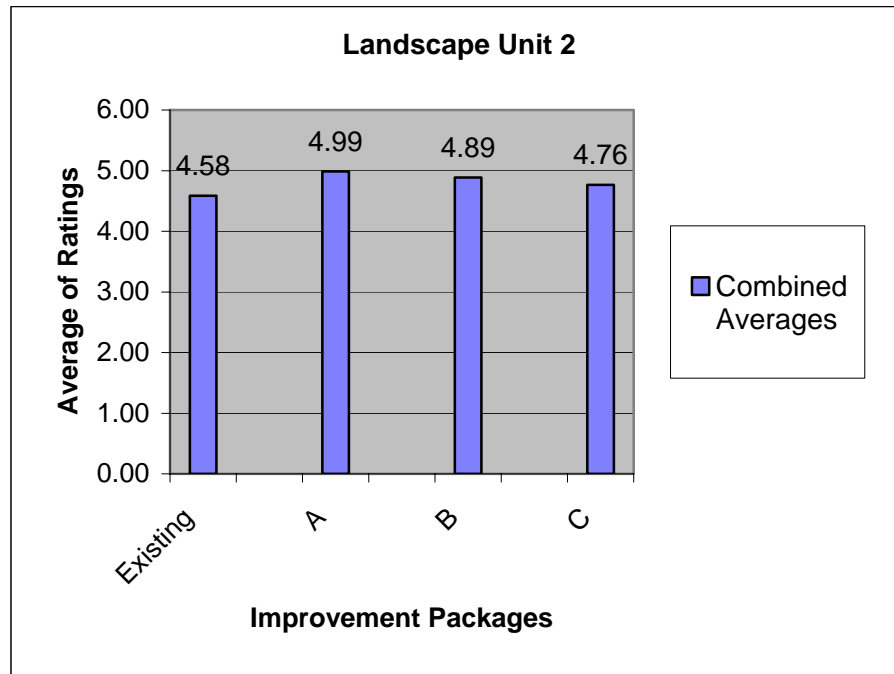


Figure 118 Landscape Unit 2 – Price/Noble, Bonnie, Swamp, and Toll Creeks CRA's Visual Quality Ratings

7.4. LANDSCAPE UNIT 3 – MP 64.41 TO MP 67.46

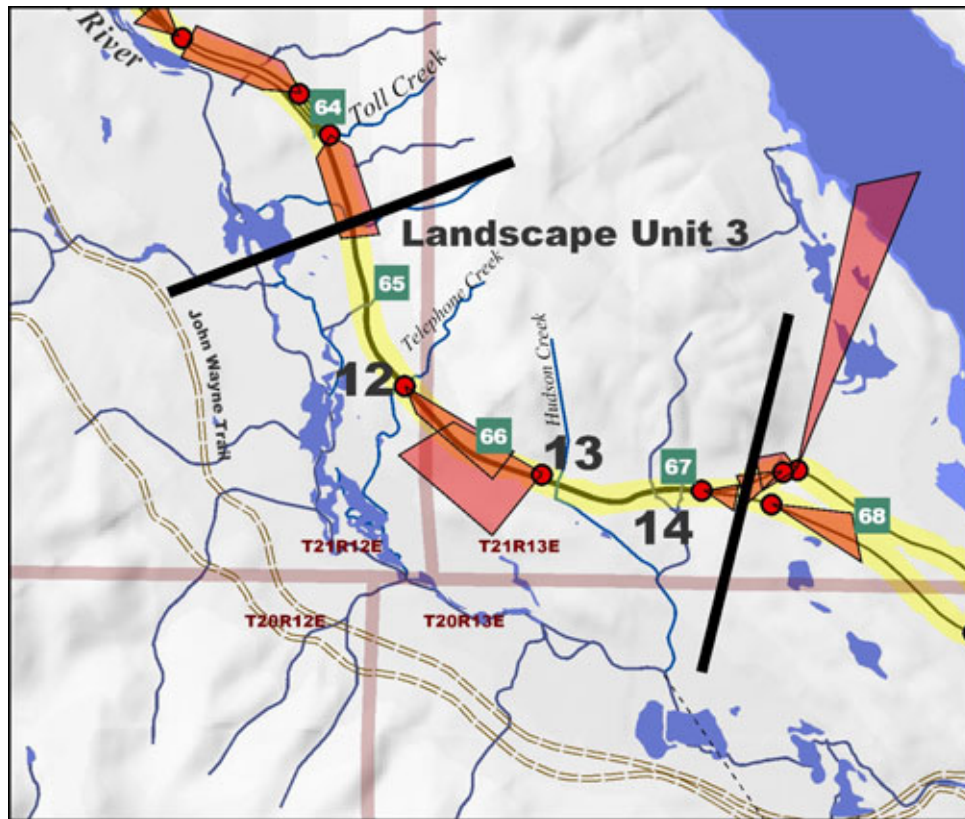


Figure 119 Landscape Unit 3 – Key Views

This segment of the project runs between a mountain to the northeast and a valley to the southwest. Bonneville Power transmission lines run between the valley and the highway. Any removal of vegetation to the southwest will expose the traveler to increased views of the transmission lines and the previously logged hills beyond, which will lower ratings for manmade objects, development, encroachment, and unity. The Build Alternative in this Landscape Unit has a minimum width median. A vertical separation of the directions of traffic is proposed, with the eastbound lanes to the southwest and approximately 10 to 20 feet below the westbound lanes. This project section will have a sloped median and swale between directions of traffic.

7.4.1. Key View 12 – MP 65.8 – Eastbound

At this location, eastbound travelers will be approximately 10 to 20 feet below the westbound lanes. The median will be wider. It will be necessary to remove trees to the right in this photo. Because of the decrease in screening vegetation, the slope of the land, and the increased visibility of the transmission lines, visual quality ratings decrease slightly. Depressing the eastbound lanes of travel may help



Figure 120 Key View 12

to compensate for the loss of trees to the right in Figure 120. Visual quality is highly dependent on retaining as many large trees to the south of the highway as possible.

Key View 12 – MP 65.8 - Eastbound – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.42
Build Alternatives	4.38

Table 25 Key View 12 – MP 65.8 – Eastbound – Total Visual Quality Ratings

7.4.2. Key View 13 – MP 66.4 – Westbound

This view is from the opposite direction of travel from Key View 12. The transmission lines will be very visible after the removal of trees.

However, the eastbound lanes will be depressed below the westbound lanes so they won't be as visible. From the westbound direction of traffic,

I-90 may actually appear to have less of an imprint than it does at present. The visual impact of the removal of trees, which results in increased visibility of the transmission lines are offset when the eastbound lanes disappear from view. Total visual quality ratings would be equal to the existing condition.



Figure 121 Key View 13

Key View 13 – MP 66.4 - Westbound – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.42
Build Alternatives	4.42

Table 26 View 13 – MP 66.4 – Westbound – Total Visual Quality Ratings

7.4.3. Key View 14 – MP 67.23 – Eastbound – Easton Hill CRA

There are three Improvement Package options on this portion of I-90. The highway will be widened to the right in Figure 122, requiring a large area of fill slope, and removal of trees. Improvement Package B would significantly impact this view. B proposes to construct an ecological connectivity structure over I-90, in the form of a vegetated bridge. It will be important to retain as many large trees as possible and to use the Architectural Guidelines on the structure portals or piers.

An example of an ecological connectivity structure, often called a "wildlife bride," from Europe is seen in Figure 123. The visual quality ratings assume a vegetated structure designed using the Architectural Guidelines.



Figure 122 Key View 14



PHOTO: SCOTT JACKSON

Figure 123 Ecological Connectivity Structure in Europe

Key View 14 – MP 67.3 – Eastbound – Easton Hill CRA – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.08
Improvement Package A	5.00
Improvement Package B	5.00
Improvement Package C	5.00

Table 27 Key View 14 – MP 67.3 – Eastbound – Easton Hill CRA – Total Visual Quality Ratings

From this viewpoint, the visual quality would decrease slightly after project completion under all Improvement Packages because of the removal of trees to the south of the highway. Under Improvement Package B, the ecological connectivity structure (sometimes known as a wildlife bridge) would cross over the highway. Though it will increase the development in the vicinity, it will also increase scores for vegetation, since the structure would be planted. The scores for all Improvement Packages are equivalent in Key View 14.

7.4.4. Summary of Ratings for Landscape Unit 3

Figure 124 is a chart that graphically compares the averages of the Hudson Creek CRA options at Key View 14. In Key Views 12 and 13, which view only the common alignment, visual quality ratings will be equal to preconstruction ratings due to mitigation measures.

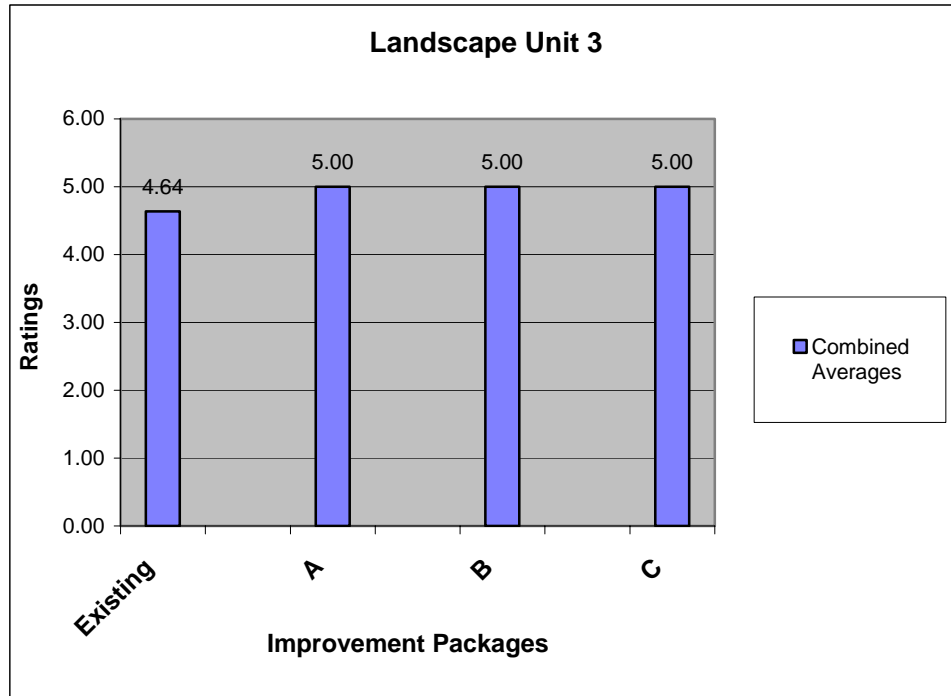


Figure 124 Visual Quality Average for the Improvement Packages in Landscape Unit 3

7.5. LANDSCAPE UNIT 4 – MP 67.46 TO MP 70.30

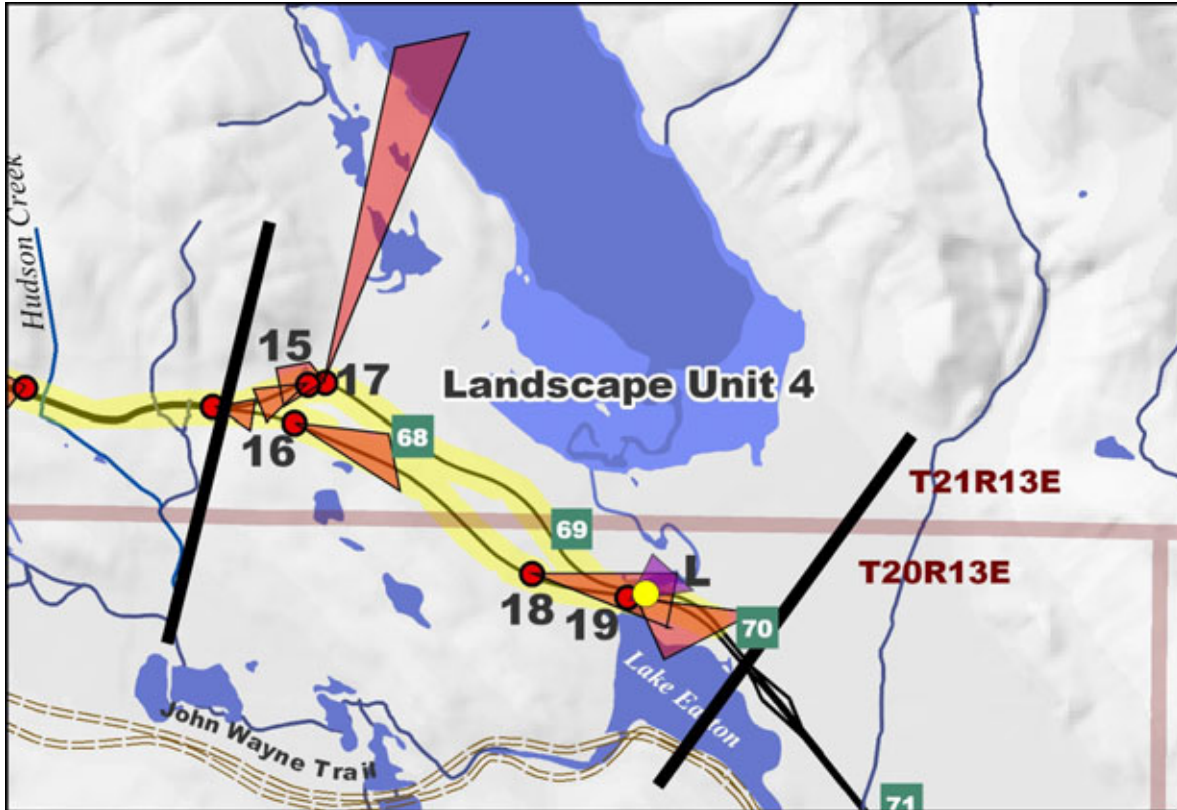


Figure 125 Landscape Unit 4 – Key Views

The Build Alternative proposes to flatten the curves at the top of Easton Hill. This will require the removal of trees along the southern edge of the existing westbound lanes and also moving the eastbound lanes to the south. The majority of the median will remain intact. There are six key views in this landscape unit.

7.5.1. Key View 15 – MP 67.73 – Westbound – Easton Hill CRA

Improvement Package A proposes a bridge under I-90 for wildlife in this vicinity that will be out of view, except for bridge railings, which will be designed using the Architectural Guidelines.

From Key View 15, travelers would see the ecological connectivity structure proposed in Improvement Package B in the background. From this distance, the ecological connectivity structure in option B would not encroach on the view. At this location, I-90 will be shifted to the left in the photo to straighten out the curve.



Figure 126 Key View 15

At this location the connectivity restoration option in Package C will be behind the viewer and is described in Key View 17. In all options, the pavement in the foreground will be removed and planted with native vegetation. Trees within the median can be seen in Figure 127.



Figure 127 Example of Second-Growth Trees to be Removed in Median near MP 67.73

While there will be an increase in development and the removal of trees in the median, all scores will remain high after project completion, and be equivalent to the existing condition because the Architectural Guidelines will be used to design structures and provide corridor continuity. The project will retain as many large trees as possible and will plant native vegetation on the roadsides. Table 28 shows the ratings for Key View 15.

Key View 15 – MP 67.23 – Westbound – Easton Hill CRA – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.50
Improvement Package A	5.50
Improvement Package B	5.50
Improvement Package C	5.50

Table 28 Key View 15 - MP 67.23 – Westbound – Easton Hill CRA – Total Visual Quality Ratings

7.5.2. Key View 16 –MP 67.7 – Eastbound – Easton Hill CRA

An additional lane will be added and the lanes moved approximately 100 feet to the right in this photo. This will allow for construction of a bridge under the roadway for a wildlife crossing in a draw that exists there now, just off the picture. Old growth trees are located approximately 150 feet from the outside edge of the right-hand lane. Trees to be removed can be seen in to the right in Key View 16. Trees that will be disturbed are generally small in diameter. However, there are some larger, old growth trees just beyond the projected edge of the eastbound lanes. They should be retained, and protected during construction, if possible. Views from this viewpoint may be enhanced if the viewer can see the old growth trees in a healthy condition. This section of second growth forest can be seen in Figure 129.



Figure 128 Key View 16



Figure 129 MP 67.7 Vicinity – Potential View into Forest

Improvement Packages A and C propose a single-span bridge, approximately 120 feet long in this vicinity of Key View 16. Bridge railings should be designed using the Architectural Guidelines for this project to enhance corridor continuity. Improvement Package B proposes no structures in the vicinity of this view. Visual quality ratings are currently high and after project completion they should be equal to current ratings and may be enhanced by the improved view into a higher quality forest.

Key View 16 – MP 67.8 – Eastbound – Easton Hill CRA – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.42
Improvement Package A	5.42
Improvement Package B	5.42
Improvement Package C	5.42

Table 29 Key View 16 – MP 67.8 – Eastbound – Easton Hill CRA – Total Visual Quality Ratings

7.5.3. Key View 17 – MP 67.8 – Westbound – Easton Hill CRA



Figure 130 Key View 17

At this location, the westbound alignment would be moved south, to the left in this photo, into the median edge, as described in Key View 15. Improvements in Packages A and B are beyond the curve ahead at MP 67.5. Improvement Package C proposes a wildlife bridge over I-90 and MP 67.7 that will be visible in the middleground from Key View 17. The wildlife bridge will be planted with grasses, trees, and shrubs. Because I-90 is shifted to the left, in this view, the project proposes to restore vegetation on the existing, unused roadbed according to Treatment Level 2 for Forest Classification from the *Roadside Classification Plan*. The structure in Improvement Package C will also be designed using the Architectural Guidelines.

Key View 17 – MP 67.8 – Westbound - Easton Hill CRA – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.50
Improvement Package A	5.50
Improvement Package B	5.50
Improvement Package C	5.42

Table 30 Key View 17 – MP 67.8 – Westbound – Easton Hill CRA – Total Visual Quality Ratings

Visual quality here is expected to remain high after construction. Option C has slightly lower ratings because of the increase in development represented by the wildlife bridge over I-90.

7.5.4. Key View 18 – MP 68.9 – Eastbound – Kachess River CRA



Figure 131 Key View 18

At this point, the median changes from hill to a wide, predominantly grassy area. Highway widening will impact young trees in the median or to the right of the roadway in Figure 131. Most trees in this vicinity are young or stressed. The climate is more arid at the east end of the project corridor than it is at the western end. The Build Alternative at the Kachess River CRA will be visible from this Key View. After project completion and plant establishment, visual quality is expected to be equal to the existing condition.

Key View 18 – MP 68.9 – Eastbound – Kachess River CRA – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	4.67
Build Alternative	4.67

Table 31 Key View 18 – MP 68.9 – Eastbound – Kachess River CRA – Total Visual Quality Ratings

7.5.5. Key View 19 – MP 69.2 – Eastbound – Kachess River CRA



Figure 132 Key View 19

This is a partial view of Lake Easton. (Water levels were low in the Fall of 2001 when the photo in Figure 132 was taken.) The project will widen the bridge over the Kachess River using the Architectural Guidelines for all elements of the bridge. This is a highly visible bridge, as seen in Key View L, Figure 133. After project completion, visual quality ratings will remain equal to the existing condition (see Table 32). Although there will be an additional lane, the use of a consistent design theme on structures and revegetation will provide corridor continuity and make this section of I-90 more memorable.

Key View 19 – MP 69.2 – Eastbound – Kachess River CRA – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.08
Build Alternative	5.08

Table 32 Key View 19 – MP 69.2 – Eastbound – Kachess River CRA – Total Visual Quality Ratings

7.5.6. Key View L – MP 69.4 – Kachess River CRA - From Lake Easton State Park



Figure 133 Key View L

This view from a popular fishing bridge has the eastbound bridge over the Kachess River in the middleground. There is only one Build Alternative at this location, widening of the bridges over the Kachess River. After construction, visual quality from this location is expected to remain equal to existing conditions through use of the Architectural Guidelines and revegetation.

Key View 18 – MP 69.4 Eastbound – Kachess River CRA – From Lake Easton State Park – Total Visual Quality Ratings	
<i>Alternatives</i>	<i>Rating</i>
Existing (No Build)	5.08
Build Alternative	5.08

Table 33 Key View L – MP 69.4 – Kachess River CRA – From Lake Easton State Park – Total Visual Quality Ratings

7.5.7. Landscape Unit 4 – Summary of Ratings

Figure 134 shows a comparison of the averages of total visual quality ratings for Key Views 15, 16, and 17, which show the Improvement Packages in Landscape Unit 4. Improvement Package A and B have equivalent visual quality ratings. All build alternatives have higher total visual quality ratings than the existing condition. Visual quality will remain high after project completion.

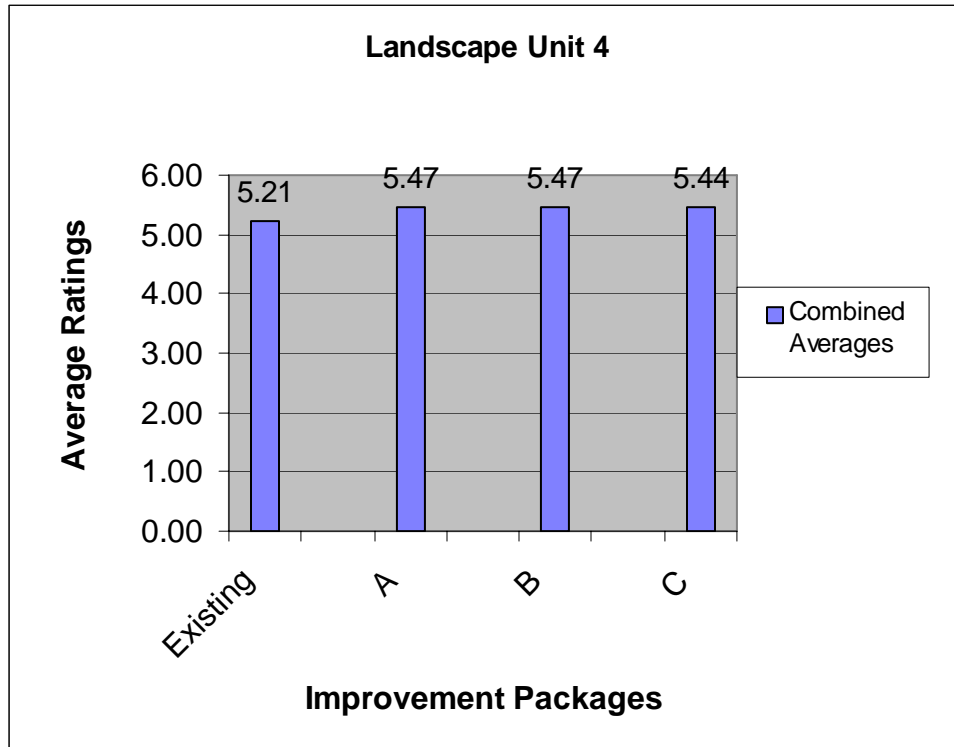


Figure 134 Landscape Unit 4 – Improvement Package Ratings

8. MITIGATION FOR PERMANENT PROJECT IMPACTS

Architectural structures, such as bridge piers and railing, bridge abutments, tunnel portals, retaining walls, traffic barriers, and light standards will carry a Cascadian theme, where possible, throughout the project corridor. The Cascadian Theme uses native stone, or concrete forms that simulate native stone, and arches. A similar treatment that has been used at Mount Rainier National Park is seen in Figure 135.

Figure 136 shows a bridge pier and railing designed with the application of the Cascadian theme, using natural stone or the appearance of native stone and arches where applicable.

Sketches in this report show an artist's concept of possible design ideas. The final design may look different than what is shown in the sketches. Design elements are at an early stage in planning and are expected to evolve, as the design is refined. Sketches are included to provide a point of departure for discussion.

A corridor theme would unite structural elements from a visual perspective and improve the visual quality ratings from those existing at present.

The *Roadside Classification Plan* is a WSDOT policy manual that states, when a mobility or improvement project

impacts an area, the roadside shall be restored from right-of-way to right-of-way line, and from beginning to the end of the project according to the roadside Character Classification. In this project corridor, the Character Classification is "Forest." Roadside restoration under Treatment Level 2 for a "Forest" classification consists of the restoration of native forest communities using small plant material (bare root, plugs, and one gallon container size plants) as well as soil restoration (which includes but is not limited to compost, topsoil, and mycorrhizal inoculation), and hydroseeding, fertilizing, and mulching. Construction impacts are temporary, and permanent project mitigation will address temporary impacts.



Figure 135 Example of Cascadian Theme Wall

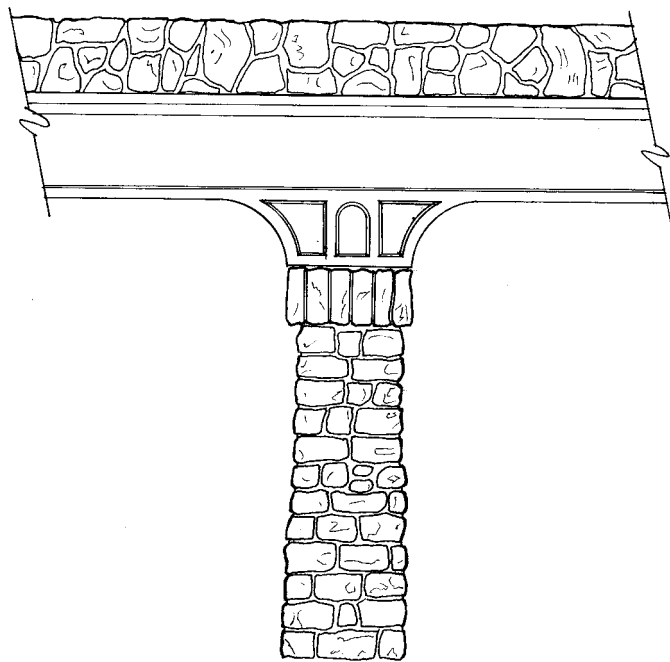


Figure 136 Bridge Pier and Railing with Cascadian Design Theme

Restoration of healthy soils and a native plant community in all disturbed areas is a foundation of the mitigation recommendations. Shrubs in the median, where possible, can provide headlight and distraction screening as well as providing some impact attenuation for run-off-the-road vehicles. Trees and shrubs within the right-of-way on roadsides blend the roadway into the surrounding landscape, provide visual screening, and facilitate driver guidance and navigation. Additional benefits to restored forest ecosystems are stormwater uptake, infiltration of stormwater into soils, particulate uptake, and erosion control. There are quantifiable benefits to restoring plant communities in the areas of air quality, water quality, aesthetics, and stormwater mitigation⁵.

Snow fencing and rock bolting are used in the project corridor at the present time. When new, they are highly visible, but they begin to blend with the hillside and vegetation begins to establish within their matrix. Much of the snow fencing will be out of sight of most viewers, either because it will be above the highway or across the lake, in the case of views toward the road. Where snow fencing will be highly visible, it should be colored to blend with the adjacent rock, or have screening vegetation planted where possible.

8.1. LIGHTING

To minimize adverse impacts from lighting (glare) associated with luminaires, directed lighting will be used. Luminaire standards found in WSDOT's *Design Manual*, Chapter 840 are directional and meet project goals. The sketch in Figure 137 shows an artist's concept of luminaires along the chain-off area in the vicinity of MP 56.

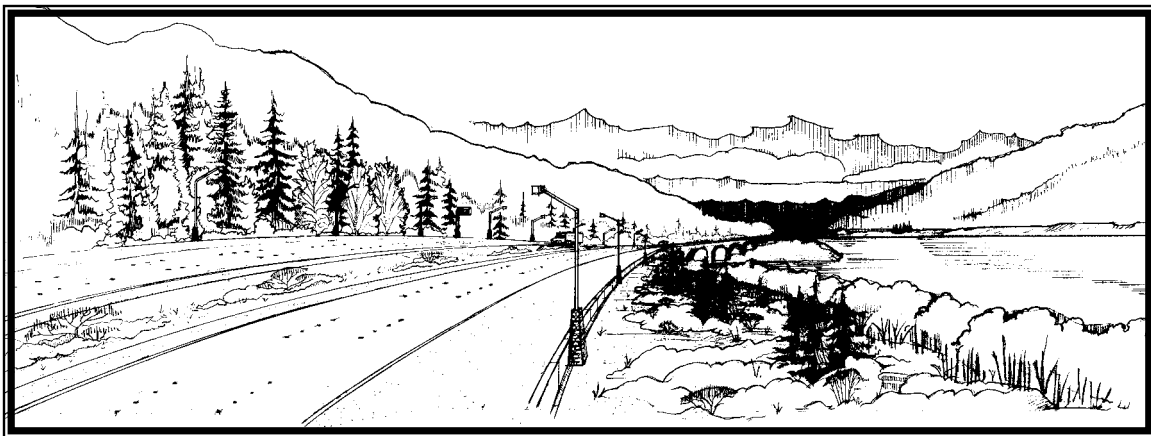


Figure 137 Key View 2 Concept

New traffic barriers should be designed to fit visually into the Cascadian corridor design theme. These barriers may include new light standard bases that fit with the corridor theme. As in all WSDOT designs, safety is the primary consideration. No design will compromise safety.

8.2. TUNNEL PORTALS

The tunnel portals and any associated structures, such as ventilation housing and maintenance facilities, should be designed according to the Architectural Guidelines with a Cascadian theme. Lighting inside the tunnel should provide glare-free illumination. Figure 138 depicts the concept

⁵ Center for Urban Forest Research. PSW Research Station. USDA Forest Service. UC Davis.
<http://cufr.ucdavis.edu/research/benefit.asp>

for Key View 3. Tunnels portals may have a headwall of native stone or simulated stone to carry the Cascadian theme.

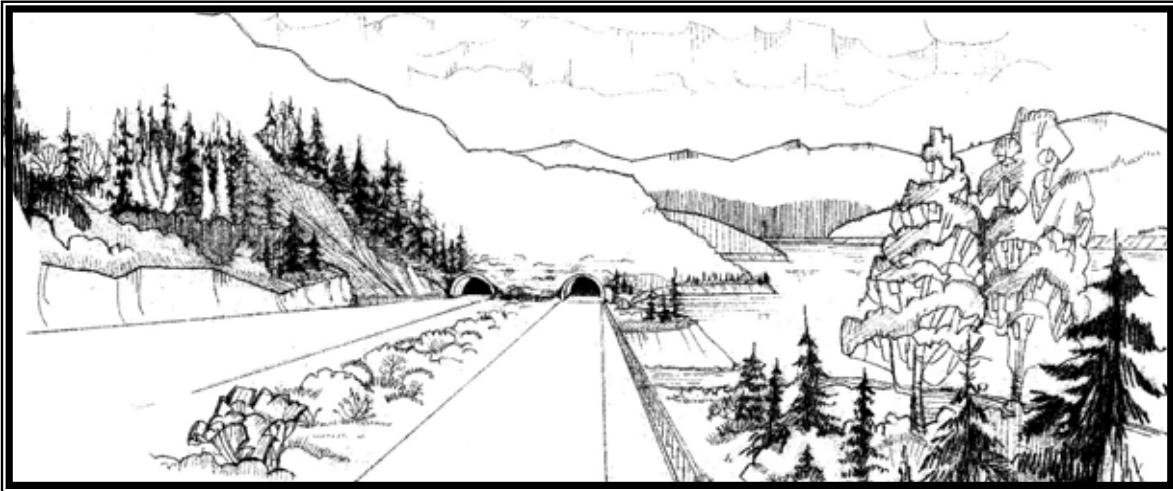


Figure 138 Key View 3 Concept

The existing roadbed, when removed, will be restored to a native forest plant community. This will blend the road with the surrounding landscape.

8.3. BRIDGES

High visibility bridges will be designed with an arch as seen in Figure 139. This is in accordance with the Architectural Guidelines. This sketch shows a railing, but patterned barriers may also be used.

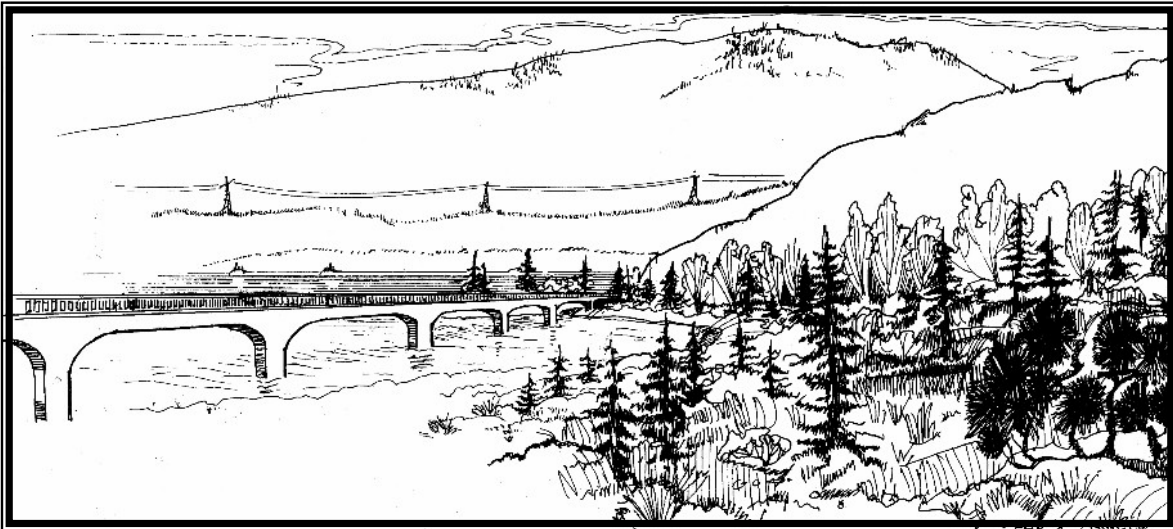


Figure 139 Typical Design Concept for Multi-Span Bridges

With the restoration of the native forest community, this alternative will be blended into the existing forest. The tunnel portals can be blended into surrounding rock using colored concrete or stains. Bridges built over the rock chutes will have the arched Cascadian design theme to carry a common rhythm throughout the corridor. The concept for this alternative is seen in Figure 140.



Figure 140 Key View E after Mitigation

8.4. WALLS AND NATIVE PLANT COMMUNITY RESTORATION

Retaining walls will be designed using the Architectural Guidelines for this project. The median will be planted with shrubs to soften the face of the wall, and to provide visual interest and color. The concept for retaining walls is seen in Figure 141.

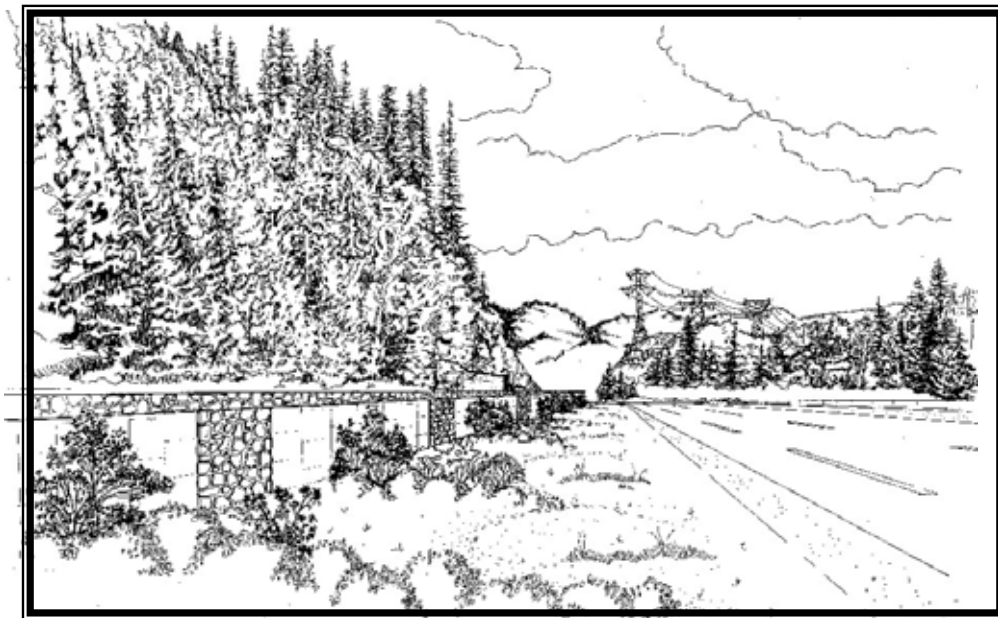


Figure 141 Concept for Retaining Walls after Project Completion & Plant Establishment

Figure 142 shows an artist's concept for the vicinity of MP 61.75 in Landscape Unit 2. It shows a forest community on the roadside and a median with shrubs.

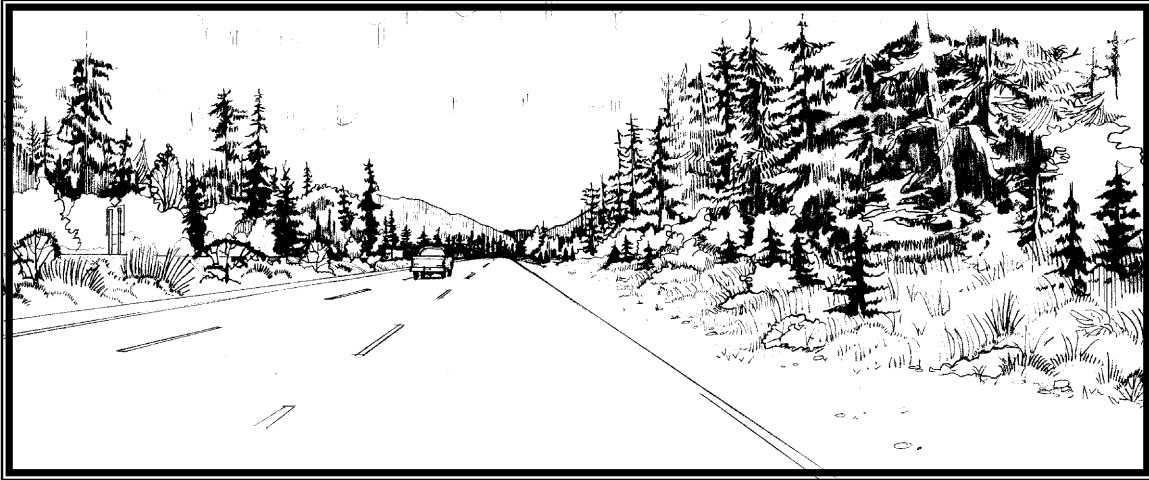


Figure 142 Key View 8 Concept

Restoration of the native forest plant community in disturbed areas and planting shrubs in the median will enhance intactness and unity ratings.

9. CONCLUSION

Because this project is on a State and National Scenic Byway, visual quality of all components of the project is especially important. Many of the views from, and toward, I-90 already have very high visual quality, and retaining that quality is one of the many objectives of this project. The Architectural Guidelines and revegetation according to Treatment Level 2 of the Forested Classification, found in the *Roadside Classification Plan* are being proposed to achieve high visual quality within the project corridor. Best Management Practices (BMPs) found in the 2004 *Highway Runoff Manual* (WSDOT) such as natural dispersion areas and compost filter strips, can improve the visual impacts of stormwater facilities by reducing the need for large stormwater ponds that were required in the past. All of these elements will provide the opportunity to blend the highway with the adjacent forest and to make the corridor even more memorable than it is at the present time.

9.1. KEECHELUS LAKE ALIGNMENT ALTERNATIVES

For the four Keechelus Lake Alignment Alternatives, Alternative 2: the Short Tunnels alternative has the highest visual quality ratings. The existing roadbed would not be needed if maintenance activities were conducted from the Hyak Maintenance facility, and fewer structures would be needed for ventilation of a smaller tunnel system than for the Long Tunnel Alternative. Alternative 2: the Short Tunnels would remove the road from the sight of viewers across the lake while minimizing the amount of time travelers on the highway would be in a tunnel. While ratings for views toward Alternative 1: Long Tunnels are very high because 1.9 miles of the existing roadbed would be removed, ratings for views from the road are very low for the time the traveler is inside the tunnel. This lowers the overall rating significantly.

Ratings for Alternatives 3 and 4 are very close to one another, and to Alternative 2. Alternatives 3 and 4 both retain I-90, with its views of the lake, around Slide Curve. Alternatives 3, and 4 have larger footprints than Alternatives 1 and 2. This decreases the opportunity for plantings to buffer and screen I-90 from views toward the road. Figure 143 provides a graphic comparison of the total average visual quality ratings for each of the Keechelus Lake Alignment Alternatives compared to the Existing Condition. Only Alternative 1 has ratings below the existing condition because of the views from the road while in the tunnel.

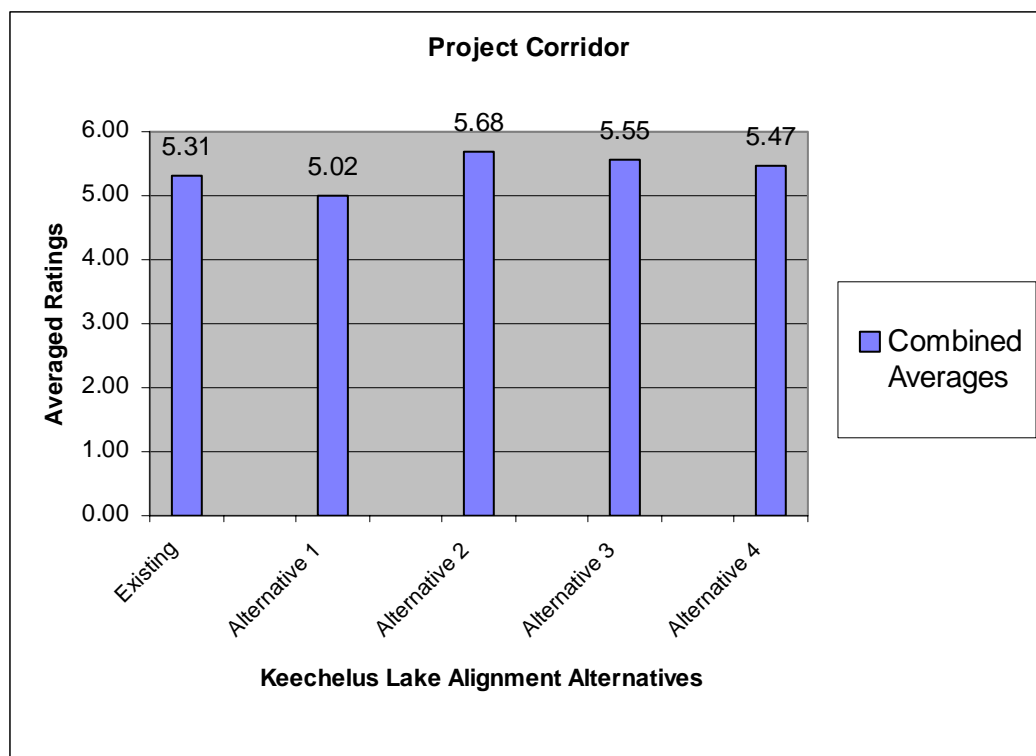


Figure 143 Comparison of Keechelus Lake Alignment Alternatives

These graphs and averages show ratings for all views from and toward the road. They provide a general basis for comparison. Details are found within each Key View description.

9.2. IMPROVEMENT PACKAGES

Where there are Improvement Package options for ecological connectivity, Improvement Package A has the highest visual quality ratings because of the opportunity for increased vegetation and the use of the Architectural Guidelines on bridge railings and bridge piers. All improvement packages are very close in visual quality averages and rate higher than the existing condition. Figure 144 shows the overall averaged ratings of the three Improvement Packages and their relationship to each other.

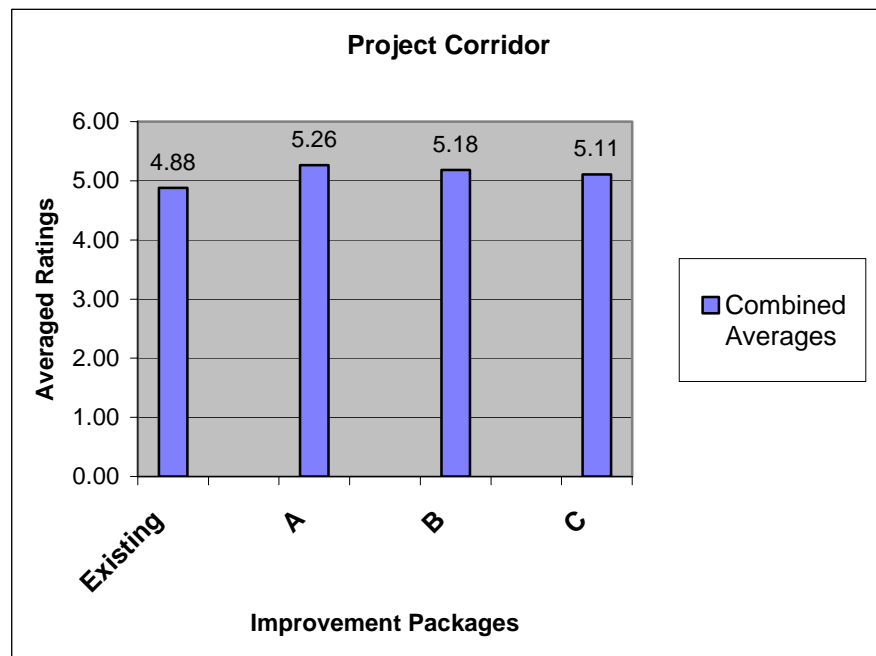


Figure 144 Comparison of Improvement Packages for Entire Project Corridor

Although the overall averages of each Improvement Package shows Option A to have the highest ratings, at some locations there are equal visual quality ratings for two options. For example, Improvement Packages A and B remove the pavement at the Price Creek Sno-park and restore native vegetation there. This results in equal ratings for Options A and B at that location. Increases in the opportunity for planting native vegetation raise visual quality ratings. Tables in Section 7 give the ratings for each Improvement Package Option at each Key View.

The combination of Improvement Package A with Keechelus Lake Alignment Alternative 2: the Short Tunnels Alternative would have the highest visual quality potential of all the proposed alternatives because of the opportunity for revegetation using a native plant community and the reduction of the I-90 footprint around Slide Curve, while not containing the traveler in a tunnel for a significant period of time under average driving conditions.

The Architectural Guidelines are a key component for providing corridor continuity – carrying a theme throughout the project corridor and for making this section of I-90 a memorable stretch of highway. When combined with native plant restoration, this project has the potential to improve the scenic quality of the Mountains to Sound Greenway between Hyak and Easton.

10. REFERENCES

- Federal Highway Administration, Office of Environmental Policy. 1988. *Visual Impact Assessment for Highway Projects*. FHWA-HI-88-054, US Department of Transportation.
- Jerry F. Franklin and C.T. Dyrness. *Natural Vegetation of Oregon and Washington*. Oregon State University Press. 1988.
- Washington State Department of Transportation. 2001. *A Case Study of Benefit-Cost Analysis: Soil Bioengineering as an Alternative for Roadside Management*.
- Washington State Department of Transportation. 1996. *Roadside Classification Plan*.
- Washington State Department of Transportation. 1999. *Roadside Manual*.

11. ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Explanation
CRA	Connectivity Restoration Area
EB	Eastbound
encroachment	undesirable eyesores
FHWA	Federal Highway Administration
MP	Milepost
swale	A wide, shallow drainage area used to infiltrate stormwater or direct water to another area
WB	Westbound

12.APPENDICES

12.1. APPENDIX A – RATINGS AND EVALUATION SHEETS

12.2. APPENDIX B – NATIVE PLANT LIST FOR I-90 PROJECT CORRIDOR

There are three primary forested climax plant vegetation zones⁶ within the project limits: a Silver Fir (*Abies amabilis*) zone; a Western Hemlock (*Tsuga heterophylla*) zone; and a Grand Fir (*Abies grandis*) zone. The most common early successional tree species in all three zones is Douglas fir, but a variety of other conifers may occur. Black cottonwood (a deciduous tree) is another early successional species and is often seen along the roadside within the project corridor.

The climax species are those that will dominate over time given particular soil and microclimate conditions. Planting a climax species on newly exposed roadsides in full sun is often not effective. Usually, early successional species, such as Douglas fir and cottonwoods, will do better on disturbed sites where little shelter is likely and consequently should be planted first. A managed succession strategy that is spread over a minimum of five years allows for the addition of climax species once the early successional species become established and provide shading.

From a visual perspective, the addition of climax species provides interest and an increased sense of place. Tree shapes and colors vary between climax species in the three communities. This can contribute to complexity and interest for travelers. An emphasis on shrubs and small multi-stemmed trees will safely provide for plantings in the median and Clear Zone, and will provide habitat and other environmental benefits, as well as spring flowers and fall color. Trees will be planted where they can safely be allowed to grow to maturity.

12.2.1. MP 55.1 to MP 62 Vicinity – Silver Fir Climax Zone

12.2.1.1. Trees

Douglas fir (*Pseudotsuga menziesii*)
Black Cottonwood (*Populus balsamifera* ssp. *trichocarpa*)
Silver Fir (*Abies amabilis*)
Western Red Cedar (*Thuja plicata*) – on warmer, wet sites
Western Hemlock (*Tsuga heterophylla*)
Grand fir (*Abies grandis*)
Noble fir (*Abies procera*)

12.2.1.2. Shrubs

Vine Maple (*Acer circinatum*)
Oregon boxwood (*Pachistima myrsinites*)
Tall Oregon Grape (*Mahonia aquifolium*) – driest sites
Cascade Oregon Grape (*Mahonia nervosa*)
Red Flowering Currant (*Ribes sanguineum*)
Red Osier Dogwood (*Cornus sericea*) – moist sites
Bald-hip Rose (*Rosa gymnocarpa*)
Thimbleberry (*Rubus parviflorus*)
Sitka Alder (*Alnus viridis* ssp. *sinuata*)
Serviceberry (*Amelanchier alnifolia*) – driest sites

⁶ Not all experts accept the Climax concept; however, it is the most widely accepted theory of plant community development at this time. Because of its ease of use as a conceptual framework it will be used in this study.

Oceanspray (*Holodiscus discolor*) – driest sites

Alaska or Oval-leaf Huckleberry (*Vaccinium alaskense* or *ovalifolium*)

Thin leaved Huckleberry (*Vaccinium membranaceum*)

Dwarf bramble or five-leaved bramble (*Rubus lasiococcus* or *pedatus*) creeping subshrubs

12.2.1.3. Grasses & Forbs

Blue wildrye (*Elymus glaucous*)

Mountain hairgrass (*Deschampsia atropurpurea*)

Thruer bentgrass (*Agrostis thurberiana*)

Alpine timothy (*Phleum alpinum*)

Columbia Brome (*Bromus vulgaris*)

Bear Grass (*Xerophyllum tenax*)

Pearly everlasting (*Anaphalis margaritacea*)

Merten's sedge (*Carex mertensii*)

Showy sedge (*Carex spectabilis*)

Thick-headed sedge (*Carex pachystachya*)

12.2.2. MP 62 to MP 67.5 Vicinity – Western Hemlock Climax Zone

12.2.2.1. Trees

Western Hemlock (*Tsuga heterophylla*)

Douglas fir (*Pseudotsuga menziesii*)

Black Cottonwood (*Populus balsamifera* ssp. *trichocarpa*)

Grand fir (*Abies grandis*)

Western White Pine (*Pinus monticola*)

12.2.2.2. Shrubs

Oregon boxwood (*Pachistima myrsinites*) – dry sites

Vine Maple (*Acer circinatum*)

Sitka Alder (*Alnus viridis* ssp. *sinuata*)

Tall Oregon Grape (*Mahonia aquifolium*) – dry sites

Cascade Oregon Grape (*Mahonia nervosa*)

Big Huckleberry (*Vaccinium membranaceum*)

Elderberry (*Sambucus racemosa*)

Serviceberry (*Amelanchier alnifolia*) – dry sites

Oceanspray (*Holodiscus discolor*) – dry sites

Twinflower (*Linnaea borealis*) creeping subshrub

12.2.2.3. Grasses & Forbs

Blue wildrye (*Elymus glaucous*)

Bear Grass (*Xerophyllum tenax*)

Pearly everlasting (*Anaphalis margaritacea*)

12.2.3. MP 67.5 to MP 70.3 Vicinity – Grand Fir Climax Zone

12.2.3.1. Trees

Douglas fir (*Pseudotsuga menziesii*)
Black Cottonwood (*Populus balsamifera* ssp *trichocarpa*)
Grand Fir (*Abies grandis*)
Ponderosa Pine (*Pinus ponderosa*)
Western Hemlock (*Tsuga heterophylla*)

12.2.3.2. Shrubs

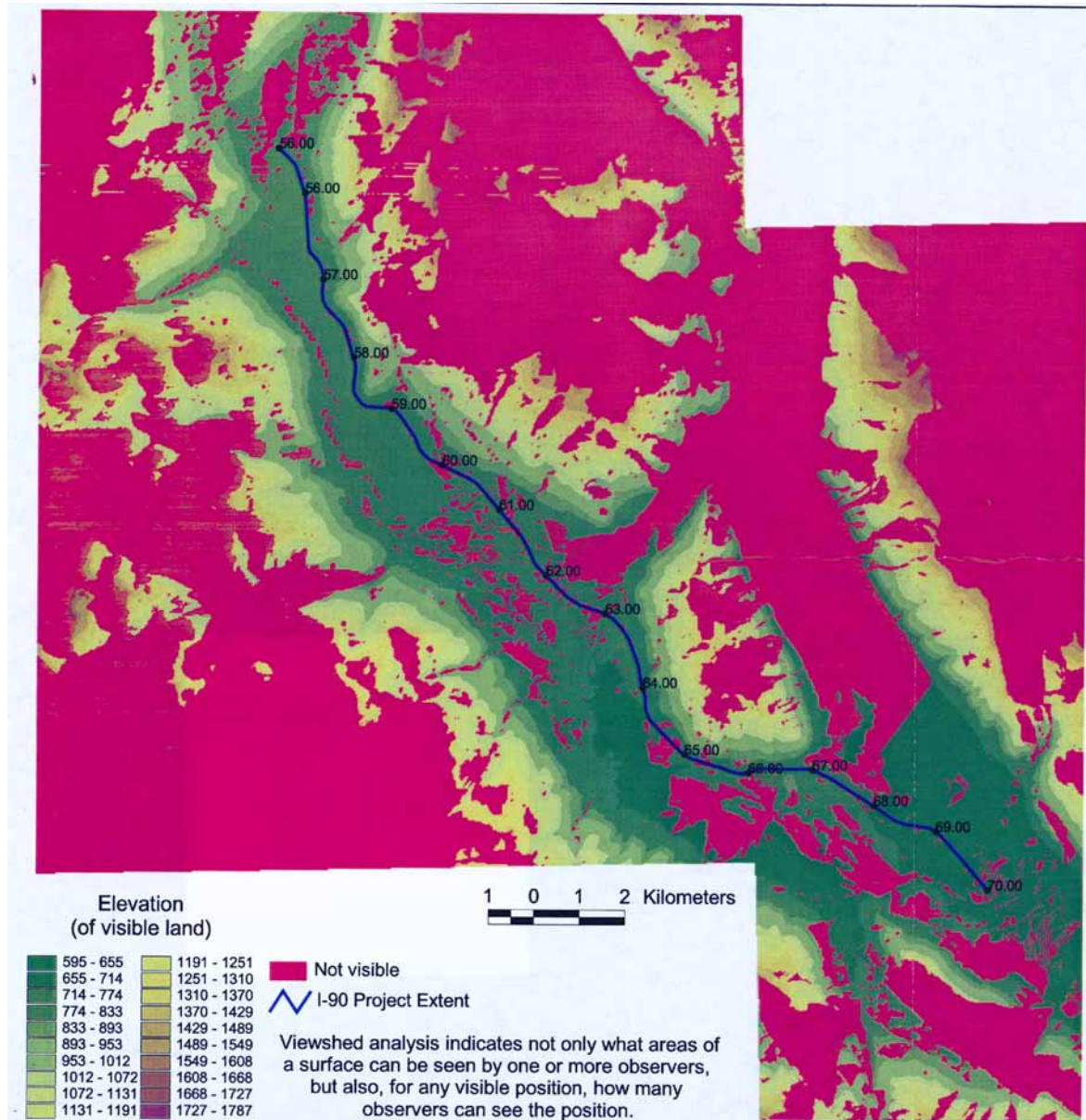
Vine Maple (*Acer circinatum*)
Oregon boxwood (*Pachistima myrsinites*)
Tall Oregon Grape (*Mahonia aquifolium*)
Cascade Oregon Grape (*Mahonia nervosa*)
Red Flowering Currant (*Ribes sanguineum*)
Serviceberry (*Amelanchier alnifolia*)
Oceanspray (*Holodiscus discolor*)
Scouler's Willow (*Salix scouleriana*)
Blue Elderberry (*Sambucus cerulea*)
Thimbleberry (*Rubus parviflorus*)
Nootka Rose (*Rosa nutkana*)
Bald-hip Rose (*Rosa gymnocarpa*)
Kinnickinnick (*Arctostaphylos uva ursi*)
Thin-leaved huckleberry (*Vaccinium membranaceum*)
Common or Creeping Snowberry (*Symphoricarpos albus* or *mollis*)
Twinflower (*Linnaea borealis*) creeping subshrub

12.2.3.3. Grasses & Forbs

Idaho Fescue (*Festuca idahoensis*) – driest sites
Sandberg's Bluegrass (*Poa sandbergii*) – driest sites
Bluebunch Wheatgrass (*Agropyron spicatum*) – driest sites
Pinegrass (*Calamagrostis rubesens*)
Hairgrass (*Deschampsia elongata*)
Blue wildrye (*Elymus glaucous*)
Western yarrow (*Achillea millifolium*)
Pearly everlasting (*Anaphalis margaritacea*)
Parsnip-flowered Buckwheat (*Eriogonum heracleoides*) – driest sites

12.3. APPENDIX C – VIEWSHED ANALYSIS

This diagram is a geographic information system (ArcInfo) analysis of what is viewable from the road. All items in red are blocked from the view of the traveler on I-90.



12.4. APPENDIX D – VEGETATION ZONES

Vegetation Zones

